

LONDON- WEST MIDLANDS ENVIRONMENTAL STATEMENT

Volume 5 | Technical Appendices

CFA22 | Whittington to Handsacre

Data appendix (LQ-001-022)

Land quality

November 2013

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Department
for Transport

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1 Introduction

1.1.1 The land quality appendices for the Whittington to Handsacre (CFA22) study area comprise:

- a summary of engagement undertaken (Section 2);
- detailed risk assessment (Section 3);
- inspection notes and other site data (Section 4);
- geological SSSI and local geological sites (Section 5);
- mining and minerals data (Section 6); and

1.1.2 Maps referred to throughout the land quality appendix are contained in the Volume 5 land quality map book.

2 Engagement

- 2.1.1 Table 1 sets out the local authorities and other organisations that have been engaged with during the preparation of the land quality section of the environmental impact assessment (EIA) for the Whittington to Handsacre study area, the types of information that have been provided to the assessment team and any specific concerns of those engaged with.

Table 1: Engagement on land quality issues undertaken for Whittington to Handsacre

Local authority or other organisation	Information provided and/or specific concerns
Lichfield District Council	Consulted for information on land contamination (via email 15th April 2013). The Council confirmed that they had no records of additional potentially contaminated areas. They confirmed that the historical landfill at Lichfield Road, Handsacre was investigated and it was concluded that this area should not be declared contaminated land and is suitable for its current residential use.
Staffordshire County Council	Meeting held on 13th March 2013. Information on mineral sites (i.e. Mineral Consultation Areas within the study area of the Proposed Scheme) received as paper copies in November 2012 and digitally on 12th April 2013.
Environment Agency	Consulted for information on landfill sites within the study area (May 2013). Information received via email July 2013.

3 Detailed risk assessment

3.1.1 This appendix presents assessments for the areas assessed as potentially posing a contaminative risk for the Proposed Scheme. For each site the following data is presented:

- baseline risk assessment;
- construction risk assessment;
- post-construction risk assessment; and
- assessment of temporary (construction) and permanent (post-construction) effects.

3.1.2 The sites assessed in this study area are set out in Table 2.

Table 2: Detailed risk assessment for areas assessed as potentially posing a contaminative risk for the Proposed Scheme.

Site reference	Name	Table numbers
22-03	Infilled mill pond	3-6
22-04	Partially infilled Wyrley and Essington Canal	7-10
22-08	Airfield	11-14
22-15	Possible infilled pond	15-18
22-18	Former airfield/military land	19-22
22-27	Former tip	23-26
22-38	Infilled pits	27-30
22-39	Infilled well	31-34
22-42 and 22-43	Infilled marl pits	35-38
22-44, 22-45	Infilled ponds	39-42
22-46	Historical landfill	43-46
22-47	Infilled pit	47-50
22-48	Whittington Heath	51-54
22-49	Whittington Barracks	55-58
22-51	Garage	59-62
22-58, 22-61 and 22-70	Existing railway lines	63-66
22-72	Former food processing plant (creamery), now metal works with associated tanks	67-70

3.1.3 Contaminant types included within the risk assessments are based on the Priority Contaminants Report CLR 8¹. Although this report has been withdrawn by the Environment Agency, there has been no subsequent authoritative document to replace it.

¹ DEFRA and Environment Agency (2002), CLR 8: Potential Contaminants for the Assessment of Land Contamination.

- 3.1.4 The remainder of this appendix presents the risk assessment for the sites set out in Table 2.

Table 3: 22-03 Infilled mill pond baseline CSM and qualitative risk assessment

Source	Receptor	Pathway	Probability	Consequence	Risk at baseline without mitigation
Infilled mill pond Existing contaminants in the soils and groundwater at the source, potentially including but not limited to a range of inorganic and organic contaminants, leachate and ground (landfill) gas.	Off-site residents	Direct contact, ingestion and inhalation of contaminants in windblown soil-derived dust	Low likelihood	Minor	Low
		Direct contact and ingestion of contaminants in migrating contaminated waters	Unlikely	Minor	Very low
		Inhalation of migrating ground-gas and volatile vapours from contaminated soil/water	Low likelihood	Minor	Low
	Controlled waters - Principal bedrock aquifer and Secondary A superficial aquifer	Leaching of contaminants from soil to groundwater and vertical and lateral migration in Principal bedrock aquifer and Secondary A superficial aquifer	Low likelihood	Minor	Low
	Controlled waters - Wyrley and Essington Canal - unnamed stream	Lateral migration of contaminants in groundwater and discharge as base flow	Unlikely	Minor	Very low
		Direct run-off from site	Unlikely	Minor	Very low
	Property - buildings, infrastructure, their foundations and services	Direct contact of property with contaminants in soil and surface water/groundwater	Low likelihood	Negligible	Very low
		Migration and accumulation of ground-gas into property	Unlikely	Moderate	Low
Main risk	Low risk				

Description

The infilled mill pond is situated on route where the Proposed Scheme would be constructed on viaduct. A realistic and worst-case scenario is assumed that the pond was manually infilled with waste and a range of contaminants including leachate and ground-(landfill) gas are associated with the infilled ground. There are residential properties adjacent to and also up to 250m from the pond. The nearest surface watercourses are an unnamed stream which flows adjacent to the northern edge of the infilled mill pond and the Wyrley and Essington Canal approximately 110m north of the infilled mill pond. Superficial deposits are classified as a Secondary A aquifer and bedrock as a Principal aquifer.

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Table 4: 22-03 Infilled mill pond construction CSM and qualitative risk assessment

Source	Receptor	Pathway	Probability	Consequence	Risk at construction with mitigation
Infilled mill pond Existing contaminants in the soils and groundwater at the source, potentially including but not limited to a range of inorganic and organic contaminants, leachate and ground (landfill) gas.	Off-site residents	Direct contact, ingestion and inhalation of contaminants in windblown soil-derived dust	Low likelihood	Minor	Low
		Direct contact and ingestion of contaminants in migrating contaminated waters	Unlikely	Minor	Very low
		Inhalation of migrating ground-gas and volatile vapours from contaminated soil/water	Low likelihood	Minor	Low
	Controlled waters - Principal bedrock aquifer and Secondary A superficial aquifer	Leaching of contaminants from soil to groundwater and vertical and lateral migration in Principal bedrock aquifer and Secondary A superficial aquifer	Likely	Minor	Moderate/low
	Controlled waters - Wyrley and Essington Canal - unnamed stream	Lateral migration of contaminants in groundwater and discharge as base flow	Unlikely	Minor	Very low
		Direct run-off from site	Unlikely	Minor	Very low
	Property - buildings, infrastructure, their foundations and services	Direct contact of property with contaminants in soil and surface water/groundwater	Low likelihood	Negligible	Very low
		Migration and accumulation of ground-gas into property	Unlikely	Moderate	Low
Main risk	Moderate/low risk				

The above risk assessment assumes that the below mitigation measures would be applied during construction:

- as the infilled mill pond lies on route, any contamination associated with it which is encountered during construction will be removed, however there may be some mobilisation of contaminants during the ground works and increased potential for leaching of contaminants to groundwater;
- it is unlikely that remediation over and above the removal of contaminated material would be required; and
- during construction standard mitigation procedures will be in place in accordance with the Code of Construction Practice (CoCP).

Table 5: 22-03 Infilled mill pond post-construction CSM and qualitative risk assessment

Source	Receptor	Pathway	Probability	Consequence	Risk at post-construction with mitigation
Infilled mill pond Existing contaminants in the soils and groundwater at the source, potentially including but not limited to a range of inorganic and organic contaminants, leachate and ground (landfill) gas.	Off-site residents	Direct contact, ingestion and inhalation of contaminants in windblown soil-derived dust	Low likelihood	Minor	Low
		Direct contact and ingestion of contaminants in migrating contaminated waters	Unlikely	Minor	Very low
		Inhalation of migrating ground-gas and volatile vapours from contaminated soil/water	Low likelihood	Minor	Low
	Controlled waters - Principal bedrock aquifer and Secondary A superficial aquifer	Leaching of contaminants from soil to groundwater and vertical and lateral migration in Principal bedrock aquifer and Secondary A superficial aquifer	Low likelihood	Minor	Low
	Controlled waters - Wyrley and Essington Canal - unnamed stream	Lateral migration of contaminants in groundwater and discharge as base flow	Unlikely	Minor	Very low
		Direct run-off from site	Unlikely	Minor	Very low
	Property - buildings, infrastructure, their foundations and services	Direct contact of property with contaminants in soil and surface water/groundwater	Low likelihood	Negligible	Very low
		Migration and accumulation of ground-gas into property	Unlikely	Moderate	Low
Main risk	Low risk				

Note

As the route passes here on viaduct, it is unlikely that the entire area of contamination will be removed; therefore risks remain same as those at baseline.

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Table 6: 22.03 Infilled mill pond significance of effect assessment

Contaminant linkage	Baseline risk	Construction risk	Post-construction risk	Construction significance	Post-construction significance
Exposure of adjacent human receptors (residents) to contamination by direct contact, ingestion and inhalation of contaminants in windblown, soil-derived dust	Low	Low	Low	Negligible	Negligible
Exposure of adjacent human receptors (residents) to contamination by direct contact and ingestion of contaminants in migrating contaminated water	Very low	Very low	Very low	Negligible	Negligible
Exposure of adjacent human receptors (residents) to contamination by inhalation of migrating ground-gas and volatile vapours from contaminated soil/water	Low	Low	Low	Negligible	Negligible
Leaching of contaminants from soil to groundwater and vertical and lateral migration in groundwater in Principal bedrock aquifer and Secondary A superficial aquifer	Low	Moderate/low	Low	Minor adverse	Negligible
Lateral migration of contaminants in groundwater and discharge to surface waters as base flow	Very low	Very low	Very low	Negligible	Negligible
Discharge of contaminants to surface water by direct run-off from site	Very low	Very low	Very low	Negligible	Negligible
Direct contact of property with contaminants in soil and surface water/groundwater	Very low	Very low	Very low	Negligible	Negligible
Migration and accumulation of ground-gas into property	Low	Low	Low	Negligible	Negligible
Main risk	Low	Moderate/low	Low		
Overall significance				Negligible – minor adverse	Negligible

Table 7: 22-04 Infilled Wyrley and Essington Canal baseline CSM and qualitative risk assessment

Source	Receptor	Pathway	Probability	Consequence	Risk at baseline without mitigation
Infilled Wyrley and Essington Canal Existing contaminants in the soils and groundwater at the source, potentially including but not limited to a range of inorganic and organic contaminants, leachate and ground (landfill) gas.	Off-site residents	Direct contact, ingestion and inhalation of contaminants in windblown soil-derived dust	Low likelihood	Minor	Low
		Direct contact and ingestion of contaminants in migrating contaminated waters	Unlikely	Minor	Very low
		Inhalation of migrating ground-gas and volatile vapours from contaminated soil/water	Low likelihood	Minor	Low
	Controlled waters - Principal bedrock aquifer	Leaching of contaminants from soil to groundwater and vertical and lateral migration in Principal bedrock aquifer	Low likelihood	Minor	Low
	Controlled waters - ponds	Lateral migration of contaminants in groundwater and discharge as base flow	Unlikely	Minor	Very low
	- Wyrley and Essington Canal - unnamed stream	Direct run-off from site	Unlikely	Minor	Very low
	Property - buildings, infrastructure, their foundations and services	Direct contact of property with contaminants in soil and surface water/groundwater	Low likelihood	Negligible	Very low
		Migration and accumulation of ground-gas into property	Unlikely	Moderate	Low
Main risk	Low risk				

Description

The Wyrley and Essington Canal is now disused, but boats still moor on the northern section (north east of Capper's Lane Bridge). It will be crossed by the Proposed Scheme on viaduct. Part of the canal (beneath Capper's Lane) has been partially infilled, and a realistic and worst-case scenario is assumed that it has been manually infilled with waste and a range of contaminants including leachate and ground-(landfill) gas are associated with the infilled ground. There are residential properties adjacent to and within 250m of the canal. The nearest surface watercourses are the Wyrley and Essington Canal, an unnamed stream approximately 110m south of the infilled canal and ponds up to 250m from the infilled canal. Bedrock is classified as a Principal aquifer.

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Table 8: 22-04 Infilled Wyrley and Essington Canal construction CSM and qualitative risk assessment

Source	Receptor	Pathway	Probability	Consequence	Risk at construction with mitigation
Infilled Wyrley and Essington Canal Existing contaminants in the soils and groundwater at the source, potentially including but not limited to a range of inorganic and organic contaminants, leachate and ground (landfill) gas.	Off-site residents	Direct contact, ingestion and inhalation of contaminants in windblown soil-derived dust	Low likelihood	Minor	Low
		Direct contact and ingestion of contaminants in migrating contaminated waters	Unlikely	Minor	Very low
		Inhalation of migrating ground-gas and volatile vapours from contaminated soil/water	Low likelihood	Minor	Low
	Controlled waters - Principal bedrock aquifer	Leaching of contaminants from soil to groundwater and vertical and lateral migration in Principal bedrock aquifer	Likely	Minor	Moderate/low
	Controlled waters - ponds - Wyrley and Essington Canal - unnamed stream	Lateral migration of contaminants in groundwater and discharge as base flow	Unlikely	Minor	Very low
		Direct run-off from site	Unlikely	Minor	Very low
	Property - buildings, infrastructure, their foundations and services	Direct contact of property with contaminants in soil and surface water/groundwater	Low likelihood	Negligible	Very low
		Migration and accumulation of ground-gas into property	Unlikely	Moderate	Low
Main risk	Moderate/low risk				

The above risk assessment assumes that the below mitigation measures would be applied during construction:

- the proposed Capper's Lane viaduct will span the infilled part of the canal there is therefore unlikely to be any disturbance of the fill during construction, however contamination may have migrated from the infilled ground and there is considered to be an increased risk to groundwater due to mobilisation and leaching of contaminants;
- it is unlikely that remediation over and above the removal of contaminated material would be required;
- during construction standard mitigation procedures will be in place in accordance with the CoCP.

Note

Construction workers have not been included as part of this assessment.

Table 9: 22-04 Infilled Wyrley and Essington Canal post-construction CSM and qualitative risk assessment

Source	Receptor	Pathway	Probability	Consequence	Risk at post-construction with mitigation
Infilled Wyrley and Essington Canal Existing contaminants in the soils and groundwater at the source, potentially including but not limited to a range of inorganic and organic contaminants, leachate and ground (landfill) gas.	Off-site residents	Direct contact, ingestion and inhalation of contaminants in windblown soil-derived dust	Low likelihood	Minor	Low
		Direct contact and ingestion of contaminants in migrating contaminated waters	Unlikely	Minor	Very low
		Inhalation of migrating ground-gas and volatile vapours from contaminated soil/water	Low likelihood	Minor	Low
	Controlled waters - Principal bedrock aquifer	Leaching of contaminants from soil to groundwater and vertical and lateral migration in Principal bedrock aquifer	Low likelihood	Minor	Low
	Controlled waters - ponds	Lateral migration of contaminants in groundwater and discharge as base flow	Unlikely	Minor	Very low
	-Wyrley and Essington Canal - unnamed stream	Direct run-off from site	Unlikely	Minor	Very low
	Property - buildings, infrastructure, their foundations and services	Direct contact of property with contaminants in soil and surface water/groundwater	Low likelihood	Negligible	Very low
		Migration and accumulation of ground-gas into property	Unlikely	Moderate	Low
Main risk	Low risk				

Note

It is unlikely that the infilled canal will be disturbed therefore the risks remain similar to those at baseline conditions.

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Table 10: 22-04 Infilled Wyrley and Essington Canal significance of effect assessment

Contaminant linkage	Baseline risk	Construction risk	Post-construction risk	Construction significance	Post-construction significance
Exposure of adjacent human receptors (residents) to contamination by direct contact, ingestion and inhalation of contaminants in windblown, soil-derived dust	Low	Low	Low	Negligible	Negligible
Exposure of adjacent human receptors (residents) to contamination by direct contact and ingestion of contaminants in migrating contaminated water	Very low	Very low	Very low	Negligible	Negligible
Exposure of adjacent human receptors (residents) to contamination by inhalation of migrating ground-gas and volatile vapours from contaminated soil/water	Low	Low	Low	Negligible	Negligible
Leaching of contaminants from soil to groundwater and vertical and lateral migration in groundwater in Principal bedrock aquifer	Low	Moderate/low	Low	Minor adverse	Negligible
Lateral migration of contaminants in groundwater and discharge to surface waters as base flow	Very low	Very low	Very low	Negligible	Negligible
Discharge of contaminants to surface water by direct run-off from site	Very low	Very low	Very low	Negligible	Negligible
Direct contact of property with contaminants in soil and surface water/groundwater	Very low	Very low	Very low	Negligible	Negligible
Migration and accumulation of ground-gas into property	Low	Low	Low	Negligible	Negligible
Main risk	Low	Moderate/low	Low		
Overall significance				Negligible to minor adverse	Negligible

Table 11: 22-o8 Airfield baseline CSM and qualitative risk assessment

Source	Receptor	Pathway	Probability	Consequence	Risk at baseline without mitigation
Airfield Existing contaminants in the soil and groundwater at the site, potentially including but not limited to fuels, oils, solvents, degreasers, metals, asbestos, ordinance, explosives residues.	Off-site residents	Direct contact, ingestion and inhalation of contaminants in windblown soil-derived dust	Low likelihood	Minor	Low
		Direct contact and ingestion of contaminants in migrating contaminated waters	Unlikely	Minor	Very low
		Inhalation of migrating volatile vapours from contaminated soil/water	Low likelihood	Minor	Low
	Users of off-site commercial properties	Direct contact, ingestion and inhalation of contaminants in windblown soil-derived dust	Low likelihood	Negligible	Very low
		Direct contact and ingestion of contaminants in migrating contaminated waters	Unlikely	Negligible	Very low
		Inhalation of migrating volatile vapours from contaminated soil/water	Low likelihood	Negligible	Very low
	Controlled waters - Secondary B bedrock aquifer	Leaching of contaminants from soil to groundwater and vertical and lateral migration in Secondary B bedrock aquifer	Low likelihood	Minor	Low
	Controlled waters - Coventry Canal - unnamed stream - ponds	Lateral migration of contaminants in groundwater and discharge as base flow	Unlikely	Minor	Very low
		Direct run-off from site	Unlikely	Minor	Very low
	Property - buildings, infrastructure, their foundations and services	Direct contact of property with contaminants in soil and surface water/groundwater	Low likelihood	Negligible	Very low
Main risk	Low risk				

Description

The airfield will be crossed by the Proposed Scheme on embankment and Streethay Sidings will be constructed partially in this area. It is understood that the airfield is used by private light aircraft. A realistic scenario has been assumed that washing, maintenance and refuelling of planes is undertaken at the airfield. There are residential properties within 100m and commercial properties within 150m of the airfield. The nearest surface watercourses include the Coventry Canal which flows adjacent east to the airfield and several ponds up to 250m from the airfield. There are no superficial deposits recorded and bedrock is classified as a Secondary B aquifer.

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Table 12: 22-o8 Airfield construction CSM and qualitative risk assessment

Source	Receptor	Pathway	Probability	Consequence	Risk at construction with mitigation
Airfield Existing contaminants in the soil and groundwater at the site, potentially including but not limited to fuels, oils, solvents, degreasers, metals, asbestos, ordinance, explosives residues.	Off-site residents	Direct contact, ingestion and inhalation of contaminants in windblown soil-derived dust	Low likelihood	Minor	Low
		Direct contact and ingestion of contaminants in migrating contaminated waters	Unlikely	Minor	Very low
		Inhalation of migrating volatile vapours from contaminated soil/water	Low likelihood	Minor	Low
	Users of off-site commercial properties	Direct contact, ingestion and inhalation of contaminants in windblown soil-derived dust	Low likelihood	Negligible	Very low
		Direct contact and ingestion of contaminants in migrating contaminated waters	Unlikely	Negligible	Very low
		Inhalation of migrating volatile vapours from contaminated soil/water	Low likelihood	Negligible	Very low
	Controlled waters - Secondary B bedrock aquifer	Leaching of contaminants from soil to groundwater and vertical and lateral migration in Secondary B bedrock aquifer	Likely	Minor	Moderate/low
	Controlled waters - Coventry Canal - unnamed stream - ponds	Lateral migration of contaminants in groundwater and discharge as base flow	Unlikely	Minor	Very low
		Direct run-off from site	Low likelihood	Minor	Low
	Property - buildings, infrastructure, their foundations and services	Direct contact of property with contaminants in soil and surface water/groundwater	Low likelihood	Negligible	Very low
Main risk	Moderate/low risk				

The above risk assessment assumes that the below mitigation measures would be applied during construction:

- as the airfield lies partially in the area of land required to build the Proposed Scheme, it is likely that part of it will be disturbed during construction. However, it is assumed that any contamination encountered will be removed during construction;
- it is unlikely that remediation over and above the removal of contaminated material would be required; and
- during construction standard mitigation procedures will be in place in accordance with the CoCP.

Table 13: 22-o8 Airfield post-construction CSM and qualitative risk assessment

Source	Receptor	Pathway	Probability	Consequence	Risk at post-construction with mitigation
Airfield Existing contaminants in the soil and groundwater at the site, potentially including but not limited to fuels, oils, solvents, degreasers, metals, asbestos, ordinance, explosives residues.	Off-site residents	Direct contact, ingestion and inhalation of contaminants in windblown soil-derived dust	Low likelihood	Minor	Low
		Direct contact and ingestion of contaminants in migrating contaminated waters	Unlikely	Minor	Very low
		Inhalation of migrating volatile vapours from contaminated soil/water	Low likelihood	Minor	Low
	Users of off-site commercial properties	Direct contact, ingestion and inhalation of contaminants in windblown soil-derived dust	Low likelihood	Negligible	Very low
		Direct contact and ingestion of contaminants in migrating contaminated waters	Unlikely	Negligible	Very low
		Inhalation of migrating volatile vapours from contaminated soil/water	Low likelihood	Negligible	Very low
	Controlled waters - Secondary B bedrock aquifer	Leaching of contaminants from soil to groundwater and vertical and lateral migration in Secondary B bedrock aquifer	Low likelihood	Minor	Low
	Controlled waters - Coventry Canal - unnamed stream - ponds	Lateral migration of contaminants in groundwater and discharge as base flow	Unlikely	Minor	Very low
		Direct run-off from site	Unlikely	Minor	Very low
	Property - buildings, infrastructure, their foundations and services	Direct contact of property with contaminants in soil and surface water/groundwater	Low likelihood	Negligible	Very low
Main risk	Low risk				

Note

It is assumed that any contaminated material encountered would be removed during construction. The parts of the airfield that lie outside of this area will, however, remain and therefore risk remains similar to that at baseline.

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Table 14: 22-08 Airfield significance of effect assessment

Contaminant linkage	Baseline risk	Construction risk	Post-construction risk	Construction significance	Post-construction significance
Exposure of off-site human receptors (residents) to contamination by direct contact, ingestion and inhalation of contaminants in windblown, soil-derived dust	Low	Low	Low	Negligible	Negligible
Exposure of off-site human receptors (residents) to contamination by direct contact and ingestion of contaminants in migrating contaminated water	Very low	Very low	Very low	Negligible	Negligible
Exposure of off-site human receptors (residents) to contamination by inhalation of migrating volatile vapours from contaminated soil/water	Low	Low	Low	Negligible	Negligible
Exposure of adjacent human receptors (commercial) to contamination by direct contact, ingestion and inhalation of contaminants in windblown, soil-derived dust	Very low	Very low	Very low	Negligible	Negligible
Exposure of adjacent human receptors (commercial) to contamination by direct contact and ingestion of contaminants in migrating contaminated water	Very low	Very low	Very low	Negligible	Negligible
Exposure of adjacent human receptors (commercial) to contamination by inhalation of migrating volatile vapours from contaminated soil/water	Very low	Very low	Very low	Negligible	Negligible
Leaching of contaminants from soil to groundwater and vertical and lateral migration in groundwater in Secondary B bedrock aquifer	Low	Moderate/low	Low	Minor adverse	Negligible
Lateral migration of contaminants in groundwater and discharge to surface waters as base flow	Very low	Very low	Very low	Negligible	Negligible
Discharge of contaminants to surface water by direct run-off from site	Very low	Low	Very low	Negligible	Negligible
Direct contact of property with contaminants in soil and surface water/groundwater	Very low	Very low	Very low	Negligible	Negligible
Main risk	Low	Moderate/low	Low		
Overall significance				Negligible – Minor adverse	Negligible

Table 15: 22-15 Infilled pond baseline CSM and qualitative risk assessment

Source	Receptor	Pathway	Probability	Consequence	Risk at baseline without mitigation
Infilled pond Existing contaminants in the soils and groundwater at the source, potentially including but not limited to a range of inorganic and organic contaminants, leachate and ground (landfill) gas.	Off-site residents	Direct contact, ingestion and inhalation of contaminants in windblown soil-derived dust	Low likelihood	Minor	Low
		Direct contact and ingestion of contaminants in migrating contaminated waters	Unlikely	Minor	Very low
		Inhalation of migrating ground-gas and volatile vapours from contaminated soil/water	Low likelihood	Minor	Low
	Users of off-site commercial properties	Direct contact, ingestion and inhalation of contaminants in windblown soil-derived dust	Low likelihood	Negligible	Very low
		Direct contact and ingestion of contaminants in migrating contaminated waters	Unlikely	Negligible	Very low
		Inhalation of migrating ground-gas and volatile vapours from contaminated soil/water	Low likelihood	Negligible	Very low
	Controlled waters - Secondary B bedrock aquifer	Leaching of contaminants from soil to groundwater and vertical and lateral migration in Secondary B bedrock aquifer	Low likelihood	Minor	Low
	Controlled waters - Coventry Canal - ponds	Lateral migration of contaminants in groundwater and discharge as base flow	Unlikely	Minor	Very low
		Direct run-off from site	Unlikely	Minor	Very low
	Property - buildings, infrastructure, their foundations and services	Direct contact of property with contaminants in soil and surface water/groundwater	Low likelihood	Negligible	Very low
		Migration and accumulation of ground-gas into property	Unlikely	Moderate	Low
Main risk	Low risk				

Description

There is an infilled pond situated in the area of land required to construct the Proposed Scheme which will be constructed on embankment. A construction compound access road will be constructed on embankment in the location of the infilled pond. A realistic and worst-case scenario is assumed that the pond was manually infilled with waste and a range of contaminants including leachate and ground-(landfill) gas are associated with the infilled ground. There are residential properties adjacent to and within 250m and commercial properties within 250m of the infilled pond. The Coventry Canal is situated approximately 250m to the east of the infilled pond and there are ponds located within 75m of the infilled pond. There are no superficial deposits recorded and bedrock is classified as a Secondary B aquifer.

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Table 16: 22-15 Infilled pond construction CSM and qualitative risk assessment

Source	Receptor	Pathway	Probability	Consequence	Risk at construction with mitigation
Infilled pond Existing contaminants in the soils and groundwater at the source, potentially including but not limited to a range of inorganic and organic contaminants, leachate and ground (landfill) gas.	Off-site residents	Direct contact, ingestion and inhalation of contaminants in windblown soil-derived dust	Low likelihood	Minor	Low
		Direct contact and ingestion of contaminants in migrating contaminated waters	Unlikely	Minor	Very low
		Inhalation of migrating ground-gas and volatile vapours from contaminated soil/water	Low likelihood	Minor	Low
	Users of off-site commercial properties	Direct contact, ingestion and inhalation of contaminants in windblown soil-derived dust	Low likelihood	Negligible	Very low
		Direct contact and ingestion of contaminants in migrating contaminated waters	Unlikely	Negligible	Very low
		Inhalation of migrating ground-gas and volatile vapours from contaminated soil/water	Low likelihood	Negligible	Very low
	Controlled waters - Secondary B bedrock aquifer	Leaching of contaminants from soil to groundwater and vertical and lateral migration in Secondary B bedrock aquifer	Low likelihood	Minor	Low
	Controlled waters - ponds	Lateral migration of contaminants in groundwater and discharge as base flow	Unlikely	Minor	Very low
		Direct run-off from site	Unlikely	Minor	Very low
	Property - buildings, infrastructure, their foundations and services	Direct contact of property with contaminants in soil and surface water/groundwater	Low likelihood	Negligible	Very low
		Migration and accumulation of ground-gas into property	Unlikely	Moderate	Low
Main risk	Low risk				

The above risk assessment assumes that the below mitigation measures would be applied during construction:

- it is unlikely that remediation over and above the removal of contaminated material would be required; and
- during construction standard mitigation procedures will be in place in accordance with the CoCP.

Note

Construction workers have not been included in this assessment. The infilled pond is unlikely to be disturbed due to construction in the vicinity taking place on embankment.

Table 17: 22-15 Infilled pond post-construction CSM and qualitative risk assessment

Source	Receptor	Pathway	Probability	Consequence	Risk at post-construction with mitigation
Infilled pond Existing contaminants in the soils and groundwater at the source, potentially including but not limited to a range of inorganic and organic contaminants, leachate and ground (landfill) gas.	Off-site residents	Direct contact, ingestion and inhalation of contaminants in windblown soil-derived dust	Low likelihood	Minor	Low
		Direct contact and ingestion of contaminants in migrating contaminated waters	Unlikely	Minor	Very low
		Inhalation of migrating ground-gas and volatile vapours from contaminated soil/water	Low likelihood	Minor	Low
	Users of off-site commercial properties	Direct contact, ingestion and inhalation of contaminants in windblown soil-derived dust	Low likelihood	Negligible	Very low
		Direct contact and ingestion of contaminants in migrating contaminated waters	Unlikely	Negligible	Very low
		Inhalation of migrating ground-gas and volatile vapours from contaminated soil/water	Low likelihood	Negligible	Very low
	Controlled waters - Secondary B bedrock aquifer	Leaching of contaminants from soil to groundwater and vertical and lateral migration in Secondary B bedrock aquifer	Low likelihood	Minor	Low
	Controlled waters - ponds	Lateral migration of contaminants in groundwater and discharge as base flow	Unlikely	Minor	Very low
		Direct run-off from site	Unlikely	Minor	Very low
	Property - buildings, infrastructure, their foundations and services	Direct contact of property with contaminants in soil and surface water/groundwater	Low likelihood	Negligible	Very low
		Migration and accumulation of ground-gas into property	Unlikely	Moderate	Low
Main risk	Low risk				

Note

The infilled pond is likely to remain undisturbed post-construction therefore the risks remain the same as those at baseline.

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Table 18: 22-15 Infilled pond significance of effect assessment

Contaminant linkage	Baseline risk	Construction risk	Post-construction risk	Construction significance	Post-construction significance
Exposure of off-site human receptors (residential) to contamination by direct contact, ingestion and inhalation of contaminants in windblown, soil-derived dust	Low	Low	Low	Negligible	Negligible
Exposure of off-site human receptors (residential) to contamination by direct contact and ingestion of contaminants in migrating contaminated water	Very low	Very low	Very low	Negligible	Negligible
Exposure of off-site human receptors (residential) to contamination by inhalation of migrating ground-gas and volatile vapours from contaminated soil/water	Low	Low	Low	Negligible	Negligible
Exposure of off-site human receptors (in commercial properties) to contamination by direct contact, ingestion and inhalation of contaminants in windblown, soil-derived dust	Very low	Very low	Very low	Negligible	Negligible
Exposure of off-site human receptors (in commercial properties) to contamination by direct contact and ingestion of contaminants in migrating contaminated water	Very low	Very low	Very low	Negligible	Negligible
Exposure of off-site human receptors (in commercial properties) to contamination by inhalation of migrating ground-gas and volatile vapours from contaminated soil/water	Very low	Very low	Very low	Negligible	Negligible
Leaching of contaminants from soil to groundwater and vertical and lateral migration in groundwater in Secondary B bedrock aquifer	Low	Low	Low	Negligible	Negligible
Lateral migration of contaminants in groundwater and discharge to surface waters as base flow	Very low	Very low	Very low	Negligible	Negligible
Discharge of contaminants to surface water by direct run-off from site	Very low	Very low	Very low	Negligible	Negligible
Direct contact of property with contaminants in soil and surface water/groundwater	Very low	Very low	Very low	Negligible	Negligible
Migration and accumulation of ground-gas into property	Low	Low	Low	Negligible	Negligible
Main risk	Low	Low	Low		
Overall significance				Negligible	Negligible

Table 19: 22-18 Former airfield/military land baseline CSM and qualitative risk assessment

Source	Receptor	Pathway	Probability	Consequence	Risk at baseline without mitigation
Former airfield/military land Existing contaminants in the soil and groundwater at the site, potentially including but not limited to fuels, oils, solvents, degreasers, metals, asbestos, ordinance, explosives residues.	On-site users of commercial properties	Direct contact, ingestion and inhalation of contaminants in soil and soil-derived dust	Low likelihood	Minor	Low
		Direct contact and ingestion of contaminants in contaminated waters	Unlikely	Minor	Very low
		Inhalation of ground gas and volatile vapours from contaminated soil/water	Low likelihood	Minor	Low
	Off-site users of commercial properties	Direct contact, ingestion and inhalation of contaminants in windblown soil-derived dust	Low likelihood	Negligible	Very low
		Direct contact and ingestion of contaminants in migrating contaminated waters	Unlikely	Negligible	Very low
		Inhalation of migrating volatile vapours from contaminated soil/water	Low likelihood	Negligible	Very low
	Controlled waters - Secondary B bedrock aquifer and Secondary A superficial aquifer	Leaching of contaminants from soil to groundwater and vertical and lateral migration in Secondary B bedrock aquifer and Secondary A superficial aquifer	Low likelihood	Minor	Low
	Controlled waters - Trent and Mersey Canal - Curborough Brook - ponds	Lateral migration of contaminants in groundwater and discharge as base flow	Unlikely	Minor	Very low
		Direct run-off from site	Unlikely	Minor	Very low
	Property - buildings, infrastructure, their foundations and services	Direct contact of property with contaminants in soil and surface water/groundwater	Low likelihood	Negligible	Very low
Main risk	Low risk				

Description

The former airfield/military land is situated at Fradley Park on route and up to 250m west and east of the area of land required to build the Proposed Scheme, which would be constructed on embankment. There will be additional highway works on-site in the area of land required for construction. A realistic scenario has been assumed that the airfield was utilised for military activities including washing, maintenance and refuelling of planes so a variety of contaminants could be present. There are commercial properties on-site and within 250m of the former airfield and the nearest surface waters include the Coventry Canal approximately 165m east of the airfield, the Trent and Mersey Canal approximately 250m north of the airfield, and ponds up to 250m from the airfield. Superficial deposits are classified as a Secondary A aquifer and bedrock deposits are classified as a Secondary B aquifer.

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Table 20: 22-18 Former airfield/military land construction CSM and qualitative risk assessment

Source	Receptor	Pathway	Probability	Consequence	Risk at construction with mitigation
Former airfield/military land Existing contaminants in the soil and groundwater at the site, potentially including but not limited to fuels, oils, solvents, degreasers, metals, asbestos, ordinance, explosives residues.	On-site users of commercial properties	Direct contact, ingestion and inhalation of contaminants in windblown soil-derived dust	Low likelihood	Minor	Low
		Direct contact and ingestion of contaminants in migrating contaminated waters	Unlikely	Minor	Very low
		Inhalation of migrating volatile vapours from contaminated soil/water	Low likelihood	Minor	Low
	Off-site users of commercial properties	Direct contact, ingestion and inhalation of contaminants in windblown soil-derived dust	Low likelihood	Negligible	Very low
		Direct contact and ingestion of contaminants in migrating contaminated waters	Unlikely	Negligible	Very low
		Inhalation of migrating volatile vapours from contaminated soil/water	Low likelihood	Negligible	Very low
	Controlled waters - Secondary B bedrock aquifer and Secondary A superficial aquifer	Leaching of contaminants from soil to groundwater and vertical and lateral migration in Secondary B bedrock aquifer and Secondary A superficial aquifer	Likely	Minor	Moderate/low
	Controlled waters - Trent and Mersey Canal - Curborough Brook - ponds	Lateral migration of contaminants in groundwater and discharge as base flow	Unlikely	Minor	Very low
		Direct run-off from site	Unlikely	Minor	Very low
	Property - buildings, infrastructure, their foundations and services	Direct contact of property with contaminants in soil and surface water/groundwater	Low likelihood	Negligible	Very low
Main risk	Moderate/low risk				

The above risk assessment assumes that the below mitigation measures would be applied during construction:

- the Proposed Scheme will cross the former airfield on embankment; additional works in the area of land required to construct the Proposed Scheme include highways works so there may be some mobilisation of any existing contamination with increased potential for leaching to groundwater.
- it is unlikely that remediation over and above the removal of contaminated material would be required; and
- during construction standard mitigation procedures will be in place in accordance with the CoCP.

Note

Construction workers have not been included in this assessment.

Table 21: 22-18 Former airfield/military land post-construction CSM and qualitative risk assessment

Source	Receptor	Pathway	Probability	Consequence	Risk at post-construction with mitigation
Former airfield/military land Existing contaminants in the soil and groundwater at the site, potentially including but not limited to fuels, oils, solvents, degreasers, metals, asbestos, ordnance, explosives residues.	On-site users of commercial properties	Direct contact, ingestion and inhalation of contaminants in windblown soil-derived dust	Low likelihood	Minor	Low
		Direct contact and ingestion of contaminants in migrating contaminated waters	Unlikely	Minor	Very low
		Inhalation of migrating volatile vapours from contaminated soil/water	Low likelihood	Minor	Low
	Off-site users of commercial properties	Direct contact, ingestion and inhalation of contaminants in windblown soil-derived dust	Low likelihood	Negligible	Very low
		Direct contact and ingestion of contaminants in migrating contaminated waters	Unlikely	Negligible	Very low
		Inhalation of migrating volatile vapours from contaminated soil/water	Low likelihood	Negligible	Very low
	Controlled waters - Secondary B bedrock aquifer and Secondary A superficial aquifer	Leaching of contaminants from soil to groundwater and vertical and lateral migration in Secondary B bedrock aquifer and Secondary A superficial aquifer	Low likelihood	Minor	Low
	Controlled waters - Trent and Mersey Canal - Curborough Brook - ponds	Lateral migration of contaminants in groundwater and discharge as base flow	Unlikely	Minor	Very low
		Direct run-off from site	Unlikely	Minor	Very low
	Property - buildings, infrastructure, their foundations and services	Direct contact of property with contaminants in soil and surface water/groundwater	Low likelihood	Negligible	Very low
Main risk	Low risk				

Note

Any contamination encountered in the area of land required to construct the Proposed Scheme will be removed during construction. However, there are parts of the military land that will not be disturbed and therefore the risks will remain the same as those at baseline.

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Table 22: 22-18 Former airfield/military land significance of effect assessment

Contaminant linkage	Baseline risk	Construction risk	Post-construction risk	Construction significance	Post-construction significance
Exposure of on-site human receptors (commercial) to contamination by direct contact, ingestion and inhalation of contaminants in windblown, soil-derived dust	Low	Low	Low	Negligible	Negligible
Exposure of on-site human receptors (commercial) to contamination by direct contact and ingestion of contaminants in contaminated water	Very low	Very low	Very low	Negligible	Negligible
Exposure of on-site human receptors (commercial) to contamination by inhalation of volatile vapours from contaminated soil/water	Low	Low	Low	Negligible	Negligible
Exposure of off-site human receptors (commercial) to contamination by direct contact, ingestion and inhalation of contaminants in windblown, soil-derived dust	Very low	Very low	Very low	Negligible	Negligible
Exposure of off-site human receptors (commercial) to contamination by direct contact and ingestion of contaminants in migrating contaminated water	Very low	Very low	Very low	Negligible	Negligible
Exposure of off-site human receptors (commercial) to contamination by inhalation of migrating volatile vapours from contaminated soil/water	Very low	Very low	Very low	Negligible	Negligible
Leaching of contaminants from soil to groundwater and vertical and lateral migration in groundwater in Secondary A superficial aquifer and Secondary B bedrock aquifer	Low	Moderate/low	Low	Minor adverse	Negligible
Lateral migration of contaminants in groundwater and discharge to surface waters as base flow	Very low	Very low	Very low	Negligible	Negligible
Discharge of contaminants to surface water by direct run-off from site	Very low	Very low	Very low	Negligible	Negligible
Direct contact of property with contaminants in soil and surface water/groundwater	Very low	Very low	Very low	Negligible	Negligible
Main risk	Low	Moderate/low	Low		
Overall significance				Negligible to minor adverse	Negligible

Table 23: 22-27 Former tip baseline CSM and qualitative risk assessment

Source	Receptor	Pathway	Probability	Consequence	Risk at baseline without mitigation
Former tip Existing contaminants in the soils and groundwater at the site, potentially including but not limited to a range of inorganic and organic contaminants, leachate and ground (landfill) gas, depending on the waste types and composition accepted.	Users of off-site commercial properties	Direct contact, ingestion and inhalation of contaminants in windblown soil-derived dust	Low likelihood	Negligible	Very low
		Direct contact and ingestion of contaminants in migrating contaminated waters	Unlikely	Negligible	Very low
		Inhalation of migrating ground gas and volatile vapours from contaminated soil/water	Low likelihood	Negligible	Very low
	Controlled waters - Secondary A superficial aquifer and Secondary B bedrock aquifer	Leaching of contaminants from soil to groundwater and vertical and lateral migration in Secondary A superficial aquifer and Secondary B bedrock aquifer	Low likelihood	Minor	Low
	Controlled waters - Trent and Mersey Canal - Curborough Brook - ponds	Lateral migration of contaminants in groundwater and discharge as base flow	Low	Minor	Low likelihood
		Direct run-off from site	Unlikely	Minor	Very low
	Property - buildings, infrastructure, their foundations and services	Direct contact of property with contaminants in soil and surface water/groundwater	Low likelihood	Negligible	Very low
		Migration and accumulation of ground-gas into property	Unlikely	Moderate	Low
Main risk	Low risk				

Description

There is a former tip situated 30m east of the area of land required to build the Proposed Scheme which will be constructed on embankment. The former tip is not listed as an historical landfill and a realistic and worst-case scenario is assumed that there a full range of inorganic and organic contaminants, leachate and ground (landfill) gas are present. The closest area of land required to construct the Proposed Scheme will be used for the construction of an access road on embankment. There are commercial properties approximately 200m from the tip. The Trent and Mersey Canal is approximately 40m north of the tip, and there is a pond adjacent to the tip. Curborough Brook is located approximately 50m north-west of the tip. Superficial deposits are recorded as a Secondary A aquifer and bedrock is classified as a Secondary B aquifer.

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Table 24: 22-27 Former tip construction CSM and qualitative risk assessment

Source	Receptor	Pathway	Probability	Consequence	Risk at construction with mitigation
<p>Former tip</p> <p>Existing contaminants in the soils and groundwater at the site, potentially including but not limited to a range of inorganic and organic contaminants, leachate and ground (landfill) gas, depending on the waste types and composition accepted.</p>	Users of off-site commercial properties	Direct contact, ingestion and inhalation of contaminants in windblown soil-derived dust	Low likelihood	Negligible	Very low
		Direct contact and ingestion of contaminants in migrating contaminated waters	Unlikely	Negligible	Very low
		Inhalation of migrating ground gas and volatile vapours from contaminated soil/water	Low likelihood	Negligible	Very low
	Controlled waters - Secondary A superficial aquifer and Secondary B bedrock aquifer	Leaching of contaminants from soil to groundwater and vertical and lateral migration in Secondary A superficial aquifer and Secondary B bedrock aquifer	Low likelihood	Minor	Low
	Controlled waters - Trent and Mersey Canal - Curborough Brook - ponds	Lateral migration of contaminants in groundwater and discharge as base flow	Unlikely	Minor	Very low
		Direct run-off from site	Unlikely	Minor	Very low
	Property - buildings, infrastructure, their foundations and services	Direct contact of property with contaminants in soil and surface water/groundwater	Low likelihood	Negligible	Very low
		Migration and accumulation of ground-gas into property	Unlikely	Moderate	Low
Main risk	Low risk				

The above risk assessment assumes that the below mitigation measures would be applied during construction:

- the former tip lies outside of the area of land required to build the Proposed Scheme and any construction works in the immediate vicinity will take place on embankment so it is unlikely to be disturbed. However, it is assumed that should any contamination be encountered relating to the former tip, it will be removed during construction; and
- during construction standard mitigation procedures will be in place in accordance with the CoCP.

Note

Construction workers have not been included in this assessment.

Table 25: 22-27 Former tip post-construction CSM and qualitative risk assessment

Source	Receptor	Pathway	Probability	Consequence	Risk at post-construction with mitigation
Former tip Existing contaminants in the soils and groundwater at the site, potentially including but not limited to a range of inorganic and organic contaminants, leachate and ground (landfill) gas, depending on the waste types and composition accepted.	Users of off-site commercial properties	Direct contact, ingestion and inhalation of contaminants in windblown soil-derived dust	Low likelihood	Negligible	Very low
		Direct contact and ingestion of contaminants in migrating contaminated waters	Unlikely	Negligible	Very low
		Inhalation of migrating ground gas and volatile vapours from contaminated soil/water	Low likelihood	Negligible	Very low
	Controlled waters - Secondary A superficial aquifer and Secondary B bedrock aquifer	Leaching of contaminants from soil to groundwater and vertical and lateral migration in Secondary A superficial aquifer and Secondary B bedrock aquifer	Low likelihood	Minor	Low
	Controlled waters - Trent and Mersey Canal - Curborough Brook - ponds	Lateral migration of contaminants in groundwater and discharge as base flow	Unlikely	Minor	Very low
		Direct run-off from site	Unlikely	Minor	Very low
	Property - buildings, infrastructure, their foundations and services	Direct contact of property with contaminants in soil and surface water/groundwater	Low likelihood	Negligible	Very low
		Migration and accumulation of ground-gas into property	Unlikely	Moderate	Low
Main risk	Low risk				

Note

The former tip is situated outside of the area of land required to build the Proposed Scheme and will remain post-construction so risks are similar to those at baseline.

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Table 26: 22-27 Former tip significance of effect assessment

Contaminant linkage	Baseline risk	Construction risk	Post-construction risk	Construction significance	Post-construction significance
Exposure of adjacent human receptors (in commercial properties) to contamination by direct contact, ingestion and inhalation of contaminants in windblown, soil-derived dust	Very low	Very low	Very low	Negligible	Negligible
Exposure of adjacent human receptors (in commercial properties) to contamination by direct contact and ingestion of contaminants in migrating contaminated water	Very low	Very low	Very low	Negligible	Negligible
Exposure of adjacent human receptors (in commercial properties) to contamination by inhalation of migrating ground-gas/volatile vapours from contaminated soil/water	Very low	Very low	Very low	Negligible	Negligible
Leaching of contaminants from soil to groundwater and vertical and lateral migration in groundwater in Secondary A superficial aquifer and Secondary B bedrock aquifer	Low	Low	Low	Negligible	Negligible
Lateral migration of contaminants in groundwater and discharge to surface waters as base flow	Very low	Very low	Very low	Negligible	Negligible
Discharge of contaminants to surface water by direct run-off from site	Very low	Very low	Very low	Negligible	Negligible
Direct contact of property with contaminants in soil and surface water/groundwater	Very low	Very low	Very low	Negligible	Negligible
Migration and accumulation of ground-gas into property	Low	Low	Low	Negligible	Negligible
Main risk	Low	Low	Low		
Overall significance				Negligible	Negligible

Table 27: 22-38 Infilled pits baseline CSM and qualitative risk assessment

Source	Receptor	Pathway	Probability	Consequence	Risk at baseline without mitigation
Infilled pits Existing contaminants in the soils and groundwater at the source, potentially including but not limited to a range of inorganic and organic contaminants, leachate and ground (landfill) gas.	Controlled waters - Secondary A superficial aquifer and Secondary B bedrock aquifer	Leaching of contaminants from soil to groundwater and vertical and lateral migration in Secondary A superficial aquifer and Secondary B bedrock aquifer	Low likelihood	Minor	Low
	Controlled waters - Bourne Brook - drain - pond	Lateral migration of contaminants in groundwater and discharge as base flow	Unlikely	Minor	Very low
		Direct run-off from site	Unlikely	Minor	Very low
	Property - infrastructure, their foundations and services	Direct contact of property with contaminants in soil and surface water/groundwater	Low likelihood	Negligible	Very low
		Migration and accumulation of ground-gas into property	Unlikely	Moderate	Low
Main risk	Low risk				

Description

The infilled pits are situated partially in the area of land required to construct the Proposed Scheme which would be constructed on embankment. The area of land closest to the infilled pits will be used for a construction compound and construction of an access road. A realistic and worst-case scenario is assumed that the pits were manually infilled with waste and a range of contaminants including leachate and ground-(landfill) gas are associated with the infilled ground. The nearest surface watercourses are Bourne Brook approximately 60m to the north-west, a drain and a pond approximately 125m to the north-east of the infilled pits. Superficial deposits are classified as Secondary A aquifer and bedrock as a Secondary B aquifer.

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Table 28: 22-38 Infilled pits construction CSM and qualitative risk assessment

Source	Receptor	Pathway	Probability	Consequence	Risk at construction with mitigation
Infilled pits Existing contaminants in the soils and groundwater at the source, potentially including but not limited to a range of inorganic and organic contaminants, leachate and ground (landfill) gas.	Controlled waters - Secondary A superficial aquifer and Secondary B bedrock aquifer	Leaching of contaminants from soil to groundwater and vertical and lateral migration in Secondary A superficial aquifer and Secondary B bedrock aquifer	Low likelihood	Minor	Low
	Controlled waters - Bourne Brook - drain - pond	Lateral migration of contaminants in groundwater and discharge as base flow	Unlikely	Minor	Very low
		Direct run-off from site	Unlikely	Minor	Very low
	Property - infrastructure, their foundations and services	Direct contact of property with contaminants in soil and surface water/groundwater	Low likelihood	Negligible	Very low
		Migration and accumulation of ground-gas into property	Unlikely	Moderate	Low
Main risk	Low risk				

The above risk assessment assumes that the below mitigation measures would be applied during construction:

- as the Proposed Scheme will be constructed on embankment in this location it is unlikely that any contamination will be disturbed during construction;
- should contamination associated with the infilled pits be encountered during construction this will be removed;
- it is unlikely that remediation over and above the removal of contaminated material would be required; and
- during construction standard mitigation procedures will be in place in accordance with the CoCP.

Table 29: 22-38 Infilled pits post-construction CSM and qualitative risk assessment

Source	Receptor	Pathway	Probability	Consequence	Risk at post-construction with mitigation
Infilled pits Existing contaminants in the soils and groundwater at the source, potentially including but not limited to a range of inorganic and organic contaminants, leachate and ground (landfill) gas.	Controlled waters - Secondary A superficial aquifer and Secondary B bedrock aquifer	Leaching of contaminants from soil to groundwater and vertical and lateral migration in Secondary A superficial aquifer and Secondary B bedrock aquifer	Low likelihood	Minor	Low
	Controlled waters - Bourne Brook - drain - pond	Lateral migration of contaminants in groundwater and discharge as base flow	Unlikely	Minor	Very low
		Direct run-off from site	Unlikely	Minor	Very low
	Property - infrastructure, their foundations and services	Direct contact of property with contaminants in soil and surface water/groundwater	Low likelihood	Negligible	Very low
		Migration and accumulation of ground-gas into property	Unlikely	Moderate	Low
Main risk	Low risk				

Note

The infilled pits are likely to remain post-construction therefore the risks remain the same as those at baseline.

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Table 30: 22-38 Infilled pits significance of effect assessment

Contaminant linkage	Baseline risk	Construction risk	Post-construction risk	Construction significance	Post-construction significance
Leaching of contaminants from soil to groundwater and vertical and lateral migration in groundwater in Secondary A superficial aquifer and Secondary B bedrock aquifer	Low	Low	Low	Negligible	Negligible
Lateral migration of contaminants in groundwater and discharge to surface waters as base flow	Very low	Very low	Very low	Negligible	Negligible
Discharge of contaminants to surface water by direct run-off from site	Very low	Very low	Very low	Negligible	Negligible
Direct contact of property with contaminants in soil and surface water/groundwater	Very low	Very low	Very low	Negligible	Negligible
Migration and accumulation of ground-gas into property	Low	Low	Low	Negligible	Negligible
Main risk	Low	Low	Low		
Overall significance				Negligible	Negligible

Table 31: 22-39 Infilled well baseline CSM and qualitative risk assessment

Source	Receptor	Pathway	Probability	Consequence	Risk at baseline without mitigation
Infilled well Existing contaminants in the soils and groundwater at the source, potentially including but not limited to a range of inorganic and organic contaminants, leachate and ground (landfill) gas.	Off-site residents	Direct contact, ingestion and inhalation of contaminants in windblown soil-derived dust	Low likelihood	Minor	Low
		Direct contact and ingestion of contaminants in migrating contaminated waters	Unlikely	Minor	Very low
		Inhalation of migrating ground gas and volatile vapours from contaminated soil/water	Low likelihood	Minor	Low
	Controlled waters - Secondary A superficial aquifer and Secondary B bedrock aquifer	Leaching of contaminants from soil to groundwater and vertical and lateral migration in Secondary A superficial aquifer and Secondary B bedrock aquifer	Low likelihood	Minor	Low
	Controlled waters - drains	Lateral migration of contaminants in groundwater and discharge as base flow	Unlikely	Minor	Very low
		Direct run-off from site	Unlikely	Minor	Very low
	Property - buildings, infrastructure, their foundations and services	Direct contact of property with contaminants in soil and surface water/groundwater	Low likelihood	Negligible	Very low
		Migration and accumulation of ground-gas into property	Unlikely	Moderate	Low
Main risk	Low risk				

Description

The infilled well is situated in the area of land required to construct the Proposed Scheme which would be constructed on embankment. The area of land required to construct the Proposed Scheme in this location will be used for ecological mitigation planting and a material stockpile transfer area. A realistic and worst-case scenario is assumed that the well was manually infilled with waste and a range of contaminants including leachate and ground-(landfill) gas are associated with the infilled ground. There are residential properties of Shaw House 50m from the infilled well and residential properties of Hanchwood House 150m from the infilled well. The nearest surface watercourses are drains, the closest of which is 190m west of the infilled well. Superficial deposits are classified as a Secondary A aquifer and bedrock as a Secondary B aquifer.

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Table 32: 22-39 Infilled well construction CSM and qualitative risk assessment

Source	Receptor	Pathway	Probability	Consequence	Risk at construction with mitigation
Infilled well Existing contaminants in the soils and groundwater at the source, potentially including but not limited to a range of inorganic and organic contaminants, leachate and ground (landfill) gas.	Off-site residents	Direct contact, ingestion and inhalation of contaminants in windblown soil-derived dust	Low likelihood	Minor	Low
		Direct contact and ingestion of contaminants in migrating contaminated waters	Unlikely	Minor	Very low
		Inhalation of migrating ground gas and volatile vapours from contaminated soil/water	Low likelihood	Minor	Low
	Controlled waters - Secondary A superficial aquifer and Secondary B bedrock aquifer	Leaching of contaminants from soil to groundwater and vertical and lateral migration in Secondary A superficial aquifer and Secondary B bedrock aquifer	Low likelihood	Minor	Low
	Controlled waters - drains	Lateral migration of contaminants in groundwater and discharge as base flow	Unlikely	Minor	Very low
		Direct run-off from site	Unlikely	Minor	Very low
	Property - buildings, infrastructure, their foundations and services	Direct contact of property with contaminants in soil and surface water/groundwater	Low likelihood	Negligible	Very low
		Migration and accumulation of ground-gas into property	Unlikely	Moderate	Low
Main risk	Low risk				

The above risk assessment assumes that the below mitigation measures would be applied during construction:

- ecological mitigation planting is unlikely to involve substantial ground disturbance so the risks are considered to remain the same as those at baseline
- should contamination associated with the infilled pits be encountered during construction this will be removed;
- it is unlikely that remediation over and above the removal of contaminated material would be required; and
- during construction standard mitigation procedures will be in place in accordance with the CoCP.

Table 33: 22-39 Infilled well post-construction CSM and qualitative risk assessment

Source	Receptor	Pathway	Probability	Consequence	Risk at post-construction with mitigation
Infilled well Existing contaminants in the soils and groundwater at the source, potentially including but not limited to a range of inorganic and organic contaminants, leachate and ground (landfill) gas.	Off-site residents	Direct contact, ingestion and inhalation of contaminants in windblown soil-derived dust	Low likelihood	Minor	Low
		Direct contact and ingestion of contaminants in migrating contaminated waters	Unlikely	Minor	Very low
		Inhalation of migrating ground gas and volatile vapours from contaminated soil/water	Low likelihood	Minor	Low
	Controlled waters - Secondary A superficial aquifer and Secondary B bedrock aquifer	Leaching of contaminants from soil to groundwater and vertical and lateral migration in Secondary A superficial aquifer and Secondary B bedrock aquifer	Low likelihood	Minor	Low
	Controlled waters - drains	Lateral migration of contaminants in groundwater and discharge as base flow	Unlikely	Minor	Very low
		Direct run-off from site	Unlikely	Minor	Very low
	Property - buildings, infrastructure, their foundations and services	Direct contact of property with contaminants in soil and surface water/groundwater	Low likelihood	Negligible	Very low
		Migration and accumulation of ground-gas into property	Unlikely	Moderate	Low
Main risk	Low risk				

Note

The infilled well is unlikely to have been any more than slightly disturbed so the risks are considered to remain the same as those at baseline.

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Table 34: 22-39 Infilled well significance of effect assessment

Contaminant linkage	Baseline risk	Construction risk	Post-construction risk	Construction significance	Post-construction significance
Exposure of adjacent human receptors (in commercial properties) to contamination by direct contact, ingestion and inhalation of contaminants in windblown, soil-derived dust	Low	Low	Low	Negligible	Negligible
Exposure of adjacent human receptors (in commercial properties) to contamination by direct contact and ingestion of contaminants in migrating contaminated water	Very low	Very low	Very low	Negligible	Negligible
Exposure of adjacent human receptors (commercial properties) to contamination by inhalation of migrating ground-gas and volatile vapours from contaminated soil/water	Low	Low	Low	Negligible	Negligible
Leaching of contaminants from soil to groundwater and vertical and lateral migration in groundwater in Secondary A superficial aquifer and Secondary B bedrock aquifer	Low	Low	Low	Negligible	Negligible
Lateral migration of contaminants in groundwater and discharge to surface waters as base flow	Very low	Very low	Very low	Negligible	Negligible
Discharge of contaminants to surface water by direct run-off from site	Very low	Very low	Very low	Negligible	Negligible
Direct contact of property with contaminants in soil and surface water/groundwater	Very low	Very low	Very low	Negligible	Negligible
Migration and accumulation of ground-gas into property	Low	Low	Low	Negligible	Negligible
Main risk	Low	Low	Low		
Overall significance				Negligible	Negligible

Table 35: 22-42 and 22-43 Infilled marl pits baseline CSM and qualitative risk assessment

Source	Receptor	Pathway	Probability	Consequence	Risk at baseline without mitigation
Infilled marl pits Existing contaminants in the soils and groundwater at the source, potentially including but not limited to a range of inorganic and organic contaminants, leachate and ground (landfill) gas.	Off-site residents	Direct contact, ingestion and inhalation of contaminants in windblown soil-derived dust	Low likelihood	Minor	Low
		Direct contact and ingestion of contaminants in migrating contaminated waters	Unlikely	Minor	Very low
		Inhalation of migrating ground gas and volatile vapours from contaminated soil/water	Low likelihood	Minor	Low
	Controlled waters - Secondary A superficial aquifers and Secondary B bedrock aquifer	Leaching of contaminants from soil to groundwater and vertical and lateral migration in Secondary A superficial aquifers and Secondary B bedrock aquifer	Low likelihood	Minor	Low
	Controlled waters - drains - ponds	Lateral migration of contaminants in groundwater and discharge as base flow	Unlikely	Minor	Very low
		Direct run-off from site	Unlikely	Minor	Very low
	Property - buildings, infrastructure, their foundations and services	Direct contact of property with contaminants in soil and surface water/groundwater	Low likelihood	Negligible	Very low
		Migration and accumulation of ground-gas into property	Unlikely	Moderate	Low
Main risk	Low risk				

Description

The infilled marl pits are situated in the area of land required to construct the Proposed Scheme which would be constructed on embankment. The land in this area will be used for ecological mitigation planting. A realistic and worst-case scenario is assumed that the pits were manually infilled with waste and a range of contaminants including leachate and ground-(landfill) gas are associated with the infilled ground. There are residential properties 180m to the north-west of the infilled marl pits and there are surface water drains within 180m to the west and south-east. Superficial deposits are classified as a Secondary A aquifer and bedrock as a Secondary B aquifer.

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Table 36: 22-42 and 22-43 Infilled marl pits construction CSM and qualitative risk assessment

Source	Receptor	Pathway	Probability	Consequence	Risk at construction with mitigation
<p>Infilled marl pits</p> <p>Existing contaminants in the soils and groundwater at the source, potentially including but not limited to a range of inorganic and organic contaminants, leachate and ground (landfill) gas.</p>	Off-site residents	Direct contact, ingestion and inhalation of contaminants in windblown soil-derived dust	Low likelihood	Minor	Low
		Direct contact and ingestion of contaminants in migrating contaminated waters	Unlikely	Minor	Very low
		Inhalation of migrating ground gas and volatile vapours from contaminated soil/water	Low likelihood	Minor	Low
	Controlled waters - Secondary A superficial aquifers and Secondary B bedrock aquifer	Leaching of contaminants from soil to groundwater and vertical and lateral migration in Secondary A superficial aquifers and Secondary B bedrock aquifer	Low likelihood	Minor	Low
	Controlled waters - drains - ponds	Lateral migration of contaminants in groundwater and discharge as base flow	Unlikely	Minor	Very low
		Direct run-off from site	Unlikely	Minor	Very low
	Property - buildings, infrastructure, their foundations and services	Direct contact of property with contaminants in soil and surface water/groundwater	Low likelihood	Negligible	Very low
		Migration and accumulation of ground-gas into property	Unlikely	Moderate	Low
Main risk	Low risk				

The above risk assessment assumes that the below mitigation measures would be applied during construction:

- the marl pits lie in the area of land required to build the Proposed Scheme. It is unlikely that either areas of infilled ground would be disturbed, but should contamination relating to the pits be encountered during construction it will be removed;
- it is unlikely that remediation over and above the removal of contaminated material would be required; and
- during construction standard mitigation procedures will be in place in accordance with the CoCP.

Table 37: 22-42 and 22-43 Infilled marl pits post-construction CSM and qualitative risk assessment

Source	Receptor	Pathway	Probability	Consequence	Risk at post-construction with mitigation
Infilled marl pits Existing contaminants in the soils and groundwater at the source, potentially including but not limited to a range of inorganic and organic contaminants, leachate and ground (landfill) gas.	Off-site residents	Direct contact, ingestion and inhalation of contaminants in windblown soil-derived dust	Low likelihood	Minor	Low
		Direct contact and ingestion of contaminants in migrating contaminated waters	Unlikely	Minor	Very low
		Inhalation of migrating ground gas and volatile vapours from contaminated soil/water	Low likelihood	Minor	Low
	Controlled waters - Secondary A superficial aquifers and Secondary B bedrock aquifer	Leaching of contaminants from soil to groundwater and vertical and lateral migration in Secondary A superficial aquifers and Secondary B bedrock aquifer	Low likelihood	Minor	Low
	Controlled waters - drains - ponds	Lateral migration of contaminants in groundwater and discharge as base flow	Unlikely	Minor	Very low
		Direct run-off from site	Unlikely	Minor	Very low
	Property - buildings, infrastructure, their foundations and services	Direct contact of property with contaminants in soil and surface water/groundwater	Low likelihood	Negligible	Very low
		Migration and accumulation of ground-gas into property	Unlikely	Moderate	Low
Main risk	Low risk				

Note

Any contaminated material encountered would be removed during construction, but the infilled marl pits will remain post-construction and therefore the risks remain similar to those at baseline.

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Table 38: 22-42 and 22-43 Infilled marl pits significance of effect assessment

Contaminant linkage	Baseline risk	Construction risk	Post-construction risk	Construction significance	Post-construction significance
Exposure of adjacent human receptors (residents) to contamination by direct contact, ingestion and inhalation of contaminants in windblown, soil-derived dust	Low	Low	Low	Negligible	Negligible
Exposure of adjacent human receptors (residents) to contamination by direct contact and ingestion of contaminants in migrating contaminated water	Very low	Very low	Very low	Negligible	Negligible
Exposure of adjacent human receptors (residents) to contamination by inhalation of migrating ground-gas and volatile vapours from contaminated soil/water	Low	Low	Low	Negligible	Negligible
Leaching of contaminants from soil to groundwater and vertical and lateral migration in groundwater in Secondary A superficial aquifers and Secondary B bedrock aquifer	Low	Low	Low	Negligible	Negligible
Lateral migration of contaminants in groundwater and discharge to surface waters as base flow	Very low	Very low	Very low	Negligible	Negligible
Discharge of contaminants to surface water by direct run-off from site	Very low	Very low	Very low	Negligible	Negligible
Direct contact of property with contaminants in soil and surface water/groundwater	Very low	Very low	Very low	Negligible	Negligible
Migration and accumulation of ground-gas into property	Low	Low	Low	Negligible	Negligible
Main risk	Low	Low	Low		
Overall significance				Negligible	Negligible

Table 39: 22-44 and 22-45 Infilled ponds baseline CSM and qualitative risk assessment

Source	Receptor	Pathway	Probability	Consequence	Risk at baseline without mitigation
Infilled ponds Existing contaminants in the soils and groundwater at the source, potentially including but not limited to a range of inorganic and organic contaminants, leachate and ground (landfill) gas.	Off-site residents	Direct contact, ingestion and inhalation of contaminants in windblown soil-derived dust	Low likelihood	Minor	Low
		Direct contact and ingestion of contaminants in migrating contaminated waters	Unlikely	Minor	Very low
		Inhalation of migrating ground gas and volatile vapours from contaminated soil/water	Low likelihood	Minor	Low
	Controlled waters - Secondary A superficial aquifers and Secondary B bedrock aquifer	Leaching of contaminants from soil to groundwater and vertical and lateral migration in Secondary A superficial aquifers and Secondary B bedrock aquifer	Low likelihood	Minor	Low
	Controlled waters - unnamed stream - ponds - drains - spring - well	Lateral migration of contaminants in groundwater and discharge as base flow	Unlikely	Minor	Very low
		Direct run-off from site	Unlikely	Minor	Very low
	Property - buildings, infrastructure, their foundations and services	Direct contact of property with contaminants in soil and surface water/groundwater	Low likelihood	Negligible	Very low
		Migration and accumulation of ground-gas into property	Unlikely	Moderate	Low
Main risk	Low risk				

Description

The infilled ponds are situated in the eastern area of land required to construct the Proposed Scheme which would be constructed on embankment. A realistic and worst-case scenario is assumed that the ponds were manually infilled with waste and a range of contaminants including leachate and ground-(landfill) gas are associated with the infilled ground. There are residential properties within 65m of the two ponds. The nearest surface watercourses within 250m of the ponds are drains, a spring, a well and an unnamed stream. Superficial deposits are classified as Secondary A aquifers and bedrock as a Secondary B aquifer.

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Table 40: 22-44 and 22-45 Infilled ponds construction CSM and qualitative risk assessment

Source	Receptor	Pathway	Probability	Consequence	Risk at construction with mitigation
Infilled ponds Existing contaminants in the soils and groundwater at the source, potentially including but not limited to a range of inorganic and organic contaminants, leachate and ground (landfill) gas.	Off-site residents	Direct contact, ingestion and inhalation of contaminants in windblown soil-derived dust	Low likelihood	Minor	Low
		Direct contact and ingestion of contaminants in migrating contaminated waters	Unlikely	Minor	Very low
		Inhalation of migrating ground gas and volatile vapours from contaminated soil/water	Low likelihood	Minor	Low
	Controlled waters - Secondary A superficial aquifers and Secondary B bedrock aquifer	Leaching of contaminants from soil to groundwater and vertical and lateral migration in Secondary A superficial aquifers and Secondary B bedrock aquifer	Low likelihood	Minor	Low
	Controlled waters - unnamed stream - drains - spring - well	Lateral migration of contaminants in groundwater and discharge as base flow	Unlikely	Minor	Very low
		Direct run-off from site	Unlikely	Minor	Very low
	Property - buildings, infrastructure, their foundations and services	Direct contact of property with contaminants in soil and surface water/groundwater	Low likelihood	Negligible	Very low
		Migration and accumulation of ground-gas into property	Unlikely	Moderate	Low
Main risk	Low risk				

The above risk assessment assumes that the below mitigation measures would be applied during construction:

- should contamination associated with the infilled ponds be encountered during construction this will be removed;
- it is unlikely that remediation over and above the removal of contaminated material would be required; and
- during construction standard mitigation procedures will be in place in accordance with the CoCP.

Table 41: 22-44 and 22-45 Infilled ponds post-construction CSM and qualitative risk assessment

Source	Receptor	Pathway	Probability	Consequence	Risk at post-construction with mitigation
Infilled ponds Existing contaminants in the soils and groundwater at the source, potentially including but not limited to a range of inorganic and organic contaminants, leachate and ground (landfill) gas.	Off-site residents	Direct contact, ingestion and inhalation of contaminants in windblown soil-derived dust	Low likelihood	Minor	Low
		Direct contact and ingestion of contaminants in migrating contaminated waters	Unlikely	Minor	Very low
		Inhalation of migrating ground gas and volatile vapours from contaminated soil/water	Low likelihood	Minor	Low
	Controlled waters - Secondary A superficial aquifers and Secondary B bedrock aquifer	Leaching of contaminants from soil to groundwater and vertical and lateral migration in Secondary A superficial aquifers and Secondary B bedrock aquifer	Low likelihood	Minor	Low
	Controlled waters - unnamed stream	Lateral migration of contaminants in groundwater and discharge as base flow	Unlikely	Minor	Very low
	- drains - spring - well	Direct run-off from site	Unlikely	Minor	Very low
	Property - buildings, infrastructure, their foundations and services	Direct contact of property with contaminants in soil and surface water/groundwater	Low likelihood	Negligible	Very low
		Migration and accumulation of ground-gas into property	Unlikely	Moderate	Low
Main risk	Low risk				

Note

Unless contamination relating to these ponds is encountered, they are likely to remain post-construction therefore the risks remain the same as those at baseline.

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Table 42: 22-44 and 22-45 Infilled ponds significance of effect assessment

Contaminant linkage	Baseline risk	Construction risk	Post-construction risk	Construction significance	Post-construction significance
Exposure of adjacent human receptors (residents) to contamination by direct contact, ingestion and inhalation of contaminants in windblown, soil-derived dust	Low	Low	Low	Negligible	Negligible
Exposure of adjacent human receptors (residents) to contamination by direct contact and ingestion of contaminants in migrating contaminated water	Low	Low	Low	Negligible	Negligible
Exposure of adjacent human receptors (residents) to contamination by inhalation of migrating ground-gas and volatile vapours from contaminated soil/water	Low	Low	Low	Negligible	Negligible
Leaching of contaminants from soil to groundwater and vertical and lateral migration in groundwater in Secondary A superficial aquifers and Secondary B bedrock aquifer	Low	Low	Low	Negligible	Negligible
Lateral migration of contaminants in groundwater and discharge to surface waters as base flow	Very low	Very low	Very low	Negligible	Negligible
Discharge of contaminants to surface water by direct run-off from site	Very low	Very low	Very low	Negligible	Negligible
Direct contact of property with contaminants in soil and surface water/groundwater	Very low	Very low	Very low	Negligible	Negligible
Migration and accumulation of ground-gas into property	Low	Low	Low	Negligible	Negligible
Main risk	Low	Low	Low		
Overall significance				Negligible	Negligible

Table 43: 22-46 Historical landfill baseline CSM and qualitative risk assessment

Source	Receptor	Pathway	Probability	Consequence	Risk at baseline without mitigation
Historical landfill Existing contaminants in the soils and groundwater at the site, potentially including but not limited to a range of organic and inorganic, leachate and ground-(landfill) gas, depending on waste types and composition.	On-site residents	Direct contact, ingestion and inhalation of contaminants in windblown soil-derived dust	Unlikely	Minor	Very low
		Direct contact and ingestion of contaminants in contaminated waters	Unlikely	Minor	Very low
		Inhalation of ground gas and volatile vapours from contaminated soil/water.	Unlikely	Minor	Very low
	Off-site residents	Direct contact, ingestion and inhalation of contaminants in windblown soil-derived dust	Unlikely	Minor	Very low
		Direct contact and ingestion of contaminants in migrating contaminated waters	Unlikely	Minor	Very low
		Inhalation of migrating ground gas and volatile vapours from contaminated soil/water	Unlikely	Minor	Very low
	Controlled waters - Secondary A superficial aquifer and Secondary B bedrock aquifer	Leaching of contaminants from soil to groundwater and vertical and lateral migration in Secondary A superficial aquifer and Secondary B bedrock aquifer	Low likelihood	Moderate	Moderate/low
	Controlled waters - unnamed stream - spring - well	Lateral migration of contaminants in groundwater and discharge as base flow	Unlikely	Minor	Very low
		Direct run-off from site	Unlikely	Minor	Very low
	Property - buildings, infrastructure, their foundations and services	Direct contact of property with contaminants in soil and surface water/groundwater	Low likelihood	Negligible	Very low
		Migration and accumulation of ground-gas into property	Unlikely	Moderate	Low
Main risk	Moderate/low risk				

Description

There is an historical landfill situated adjacent west to the area of land required to build the Proposed Scheme which will be constructed on embankment. The landfill is listed as accepting industrial pottery waste and the area has been developed for residential use. A range of organic and inorganic contaminants including heavy metals, leachate and ground-(landfill) gas may be associated with the historical landfill. A Part 2A site investigation was completed by Lichfield District Council in November 2010 which concluded that the historical landfill site should not be declared as contaminative and was suitable for the current residential use. There are residential properties on the site of and within 250m of the historical landfill. The nearest surface waters are a spring approximately 10m south, a well approximately 40m south and an unnamed stream approximately 250m east of the historical landfill. Superficial Deposits are recorded as Secondary A aquifer and bedrock is classified as a Secondary B aquifer.

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Table 44: 22-46 Historical landfill construction CSM and qualitative risk assessment

Source	Receptor	Pathway	Probability	Consequence	Risk at construction with mitigation
Historical landfill Existing contaminants in the soils and groundwater at the site, potentially including but not limited to a range of organic and inorganic, leachate and ground- (landfill) gas, depending on waste types and composition.	On-site residents	Direct contact, ingestion and inhalation of contaminants in windblown soil-derived dust	Unlikely	Minor	Very low
		Direct contact and ingestion of contaminants in contaminated waters	Unlikely	Minor	Very low
		Inhalation of ground gas and volatile vapours from contaminated soil/water	Unlikely	Minor	Very low
	Off-site residents	Direct contact, ingestion and inhalation of contaminants in windblown soil-derived dust	Unlikely	Minor	Very low
		Direct contact and ingestion of contaminants in migrating contaminated waters	Unlikely	Minor	Very low
		Inhalation of migrating ground gas and volatile vapours from contaminated soil/water	Unlikely	Minor	Very low
	Controlled waters - Secondary A superficial aquifer and Secondary B bedrock aquifer	Leaching of contaminants from soil to groundwater and vertical and lateral migration in Secondary A superficial aquifer and Secondary B bedrock aquifer	Low likelihood	Moderate	Moderate/low
	Controlled waters - unnamed stream - spring - well	Lateral migration of contaminants in groundwater and discharge as base flow	Unlikely	Minor	Very low
		Direct run-off from site	Unlikely	Minor	Very low
	Property - buildings, infrastructure, their foundations and services	Direct contact of property with contaminants in soil and surface water/groundwater	Low likelihood	Negligible	Very low
		Migration and accumulation of ground-gas into property	Unlikely	Moderate	Low

Main risk

Moderate/low risk

The above risk assessment assumes that the below mitigation measures would be applied during construction:

- the historical landfill lies outside of the area of land required to build the Proposed Scheme and so is unlikely to be disturbed. However, it is assumed that should any contamination be encountered relating to the historical landfill, it will be removed during construction;
- it is unlikely that remediation over and above the removal of contaminated material would be required; and
- during construction standard mitigation procedures will be in place in accordance with the CoCP.

Note

Construction workers have not been included in this assessment.

Table 45: 22-46 Historical landfill post-construction CSM and qualitative risk assessment

Source	Receptor	Pathway	Probability	Consequence	Risk at post-construction with mitigation
Historical landfill Existing contaminants in the soils and groundwater at the site, potentially including but not limited to a range of organic and inorganic, leachate and ground- (landfill) gas, depending on waste types and composition.	On-site residents	Direct contact, ingestion and inhalation of contaminants in windblown soil-derived dust	Unlikely	Minor	Very low
		Direct contact and ingestion of contaminants in contaminated waters	Unlikely	Minor	Very low
		Inhalation of ground gas and volatile vapours from contaminated soil/water	Unlikely	Minor	Very low
	Off-site residents	Direct contact, ingestion and inhalation of contaminants in windblown soil-derived dust	Unlikely	Minor	Very low
		Direct contact and ingestion of contaminants in migrating contaminated waters	Unlikely	Minor	Very low
		Inhalation of migrating ground gas and volatile vapours from contaminated soil/water	Unlikely	Minor	Very low
	Controlled waters - Secondary A superficial aquifer and Secondary B bedrock aquifer	Leaching of contaminants from soil to groundwater and vertical and lateral migration in Secondary A superficial aquifer and Secondary B bedrock aquifer	Low likelihood	Moderate	Moderate/low
	Controlled waters - unnamed stream - spring - well	Lateral migration of contaminants in groundwater and discharge as base flow	Unlikely	Minor	Very low
		Direct run-off from site	Unlikely	Minor	Very low
	Property - buildings, infrastructure, their foundations and services	Direct contact of property with contaminants in soil and surface water/groundwater	Low likelihood	Negligible	Very low
		Migration and accumulation of ground-gas into property	Unlikely	Moderate	Low
Main risk	Moderate/low risk				

Note

The historical landfill is situated outside of the area of land required to build the Proposed Scheme and any contamination encountered within this area would be removed during construction. The landfill will, however, remain post-construction and so risks are similar to those at baseline.

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Table 46: 22-46 Historical landfill significance of effect assessment

Contaminant linkage	Baseline risk	Construction risk	Post-construction risk	Construction significance	Post-construction significance
Exposure of on-site human receptors (residents) to contamination by direct contact, ingestion and inhalation of contaminants in windblown, soil-derived dust	Very low	Very low	Very low	Negligible	Negligible
Exposure of on-site human receptors (residents) to contamination by direct contact and ingestion of contaminants in contaminated water	Very low	Very low	Very low	Negligible	Negligible
Exposure of on-site human receptors (residents) to contamination by inhalation of ground-gas/volatile vapours from contaminated soil/water	Very low	Very low	Very low	Negligible	Negligible
Exposure of adjacent human receptors (residents) to contamination by direct contact, ingestion and inhalation of contaminants in windblown, soil-derived dust	Very low	Very low	Very low	Negligible	Negligible
Exposure of adjacent human receptors (residents) to contamination by direct contact and ingestion of contaminants in migrating contaminated water	Very low	Very low	Very low	Negligible	Negligible
Exposure of adjacent human receptors (residents) to contamination by inhalation of migrating ground-gas/volatile vapours from contaminated soil/water	Very low	Very low	Very low	Negligible	Negligible
Leaching of contaminants from soil to groundwater and vertical and lateral migration in groundwater in Secondary A superficial aquifer and Secondary B bedrock aquifer	Moderate/low	Moderate/low	Moderate/low	Negligible	Negligible
Lateral migration of contaminants in groundwater and discharge to surface waters as base flow	Very low	Very low	Very low	Negligible	Negligible
Discharge of contaminants to surface water by direct run-off from site	Very low	Very low	Very low	Negligible	Negligible
Direct contact of property with contaminants in soil and surface water/groundwater	Very low	Very low	Very low	Negligible	Negligible
Migration and accumulation of ground-gas into property	Low	Low	Low	Negligible	Negligible
Main risk	Moderate/low	Moderate/low	Moderate/low		
Overall significance				Negligible	Negligible

Table 47: 22-47 Infilled pit baseline CSM and qualitative risk assessment

Source	Receptor	Pathway	Probability	Consequence	Risk at baseline without mitigation
Infilled pit Existing contaminants in the soils and groundwater at the source, potentially including but not limited to a range of inorganic and organic contaminants, leachate and ground (landfill) gas.	Off-site residents	Direct contact, ingestion and inhalation of contaminants in windblown soil-derived dust	Low likelihood	Minor	Low
		Direct contact and ingestion of contaminants in migrating contaminated waters	Unlikely	Minor	Very low
		Inhalation of migrating ground gas and volatile vapours from contaminated soil/water	Low likelihood	Minor	Low
	Off-site users of school	Direct contact, ingestion and inhalation of contaminants in windblown soil-derived dust	Low likelihood	Minor	Low
		Direct contact and ingestion of contaminants in migrating contaminated waters	Unlikely	Minor	Very low
		Inhalation of migrating ground gas and volatile vapours from contaminated soil/water	Low likelihood	Minor	Low
	Controlled waters - Secondary A superficial aquifers and Secondary B bedrock aquifer	Leaching of contaminants from soil to groundwater and vertical and lateral migration in Secondary A superficial aquifers and Secondary B bedrock aquifer	Low likelihood	Minor	Low
	Controlled waters - Trent and Mersey Canal	Lateral migration of contaminants in groundwater and discharge as base flow	Unlikely	Minor	Very low
		Direct run-off from site	Unlikely	Minor	Very low
	Property - buildings, infrastructure, their foundations and services	Direct contact of property with contaminants in soil and surface water/groundwater	Low likelihood	Negligible	Very low
		Migration and accumulation of ground-gas into property	Low likelihood	Minor	Low
Main risk	Low risk				

Description

The infilled pit is situated in the eastern area of the land required to construct the Proposed Scheme on the route of a proposed access road which would be constructed at grade. A realistic and worst-case scenario is assumed that the pit was manually infilled with waste and a range of contaminants including leachate and ground-(landfill) gas are associated with the infilled ground. There are residential properties within 250m of the pit and a school within 30m of the infilled pit. The nearest surface watercourses within 250m of the pit includes the Trent and Mersey Canal. Superficial deposits are classified as Secondary A aquifers and bedrock as a Secondary B aquifer.

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Table 48: 22-47 Infilled pit construction CSM and qualitative risk assessment

Source	Receptor	Pathway	Probability	Consequence	Risk at construction with mitigation
Infilled pit Existing contaminants in the soils and groundwater at the source, potentially including but not limited to a range of inorganic and organic contaminants, leachate and ground (landfill) gas.	Off-site residents	Direct contact, ingestion and inhalation of contaminants in windblown soil-derived dust	Low likelihood	Minor	Low
		Direct contact and ingestion of contaminants in migrating contaminated waters	Unlikely	Minor	Very low
		Inhalation of migrating ground gas and volatile vapours from contaminated soil/water	Low likelihood	Minor	Low
	Off-site users of school	Direct contact, ingestion and inhalation of contaminants in windblown soil-derived dust	Low likelihood	Minor	Low
		Direct contact and ingestion of contaminants in migrating contaminated waters	Unlikely	Minor	Very low
		Inhalation of migrating ground gas and volatile vapours from contaminated soil/water	Low likelihood	Minor	Low
	Controlled waters - Secondary A superficial aquifers and Secondary B bedrock aquifer	Leaching of contaminants from soil to groundwater and vertical and lateral migration in Secondary A superficial aquifers and Secondary B bedrock aquifer	Likely	Minor	Moderate/low
	Controlled waters - Trent and Mersey Canal	Lateral migration of contaminants in groundwater and discharge as base flow	Unlikely	Minor	Very low
		Direct run-off from site	Unlikely	Minor	Very low
	Property - buildings, infrastructure, their foundations and services	Direct contact of property with contaminants in soil and surface water/groundwater	Low likelihood	Negligible	Very low
		Migration and accumulation of ground-gas into property	Low likelihood	Minor	Low
Main risk	Moderate/low risk				

The above risk assessment assumes that the below mitigation measures would be applied during construction:

- the infilled pit lies on the route of an access road so it is likely to be disturbed during construction. Should contamination associated with the infilled pit be encountered during construction this will be removed;
- it is unlikely that remediation over and above the removal of contaminated material would be required; and
- during construction standard mitigation procedures will be in place in accordance with the CoCP.

Table 49: 22-47 Infilled pit post-construction CSM and qualitative risk assessment

Source	Receptor	Pathway	Probability	Consequence	Risk at post-construction with mitigation
Infilled pit Existing contaminants in the soils and groundwater at the source, potentially including but not limited to a range of inorganic and organic contaminants, leachate and ground (landfill) gas.	Off-site residents	Direct contact, ingestion and inhalation of contaminants in windblown soil-derived dust	Low likelihood	Negligible	Very low
		Direct contact and ingestion of contaminants in migrating contaminated waters	Unlikely	Negligible	Very low
		Inhalation of migrating ground gas and volatile vapours from contaminated soil/water	Low likelihood	Negligible	Very low
	Off-site users of school	Direct contact, ingestion and inhalation of contaminants in windblown soil-derived dust	Low likelihood	Negligible	Very low
		Direct contact and ingestion of contaminants in migrating contaminated waters	Unlikely	Negligible	Very low
		Inhalation of migrating ground gas and volatile vapours from contaminated soil/water	Low likelihood	Negligible	Very low
	Controlled waters - Secondary A superficial aquifers and Secondary B bedrock aquifer	Leaching of contaminants from soil to groundwater and vertical and lateral migration in Secondary A superficial aquifers and Secondary B bedrock aquifer	Low likelihood	Negligible	Very low
	Controlled waters - Trent and Mersey Canal	Lateral migration of contaminants in groundwater and discharge as base flow	Unlikely	Negligible	Very low
		Direct run-off from site	Unlikely	Negligible	Very low
	Property - buildings, infrastructure, their foundations and services	Direct contact of property with contaminants in soil and surface water/groundwater	Low likelihood	Negligible	Very low
		Migration and accumulation of ground-gas into property	Unlikely	Negligible	Very low
Main risk	Very low risk				

Note

It is assumed that any contamination encountered will have been removed or remediated during construction

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Table 50: 22-47 Infilled pit significance of effect assessment

Contaminant linkage	Baseline risk	Construction risk	Post-construction risk	Construction significance	Post-construction significance
Exposure of adjacent human receptors (residents) to contamination by direct contact, ingestion and inhalation of contaminants in windblown, soil-derived dust	Low	Low	Very low	Negligible	Minor beneficial
Exposure of adjacent human receptors (residents) to contamination by direct contact and ingestion of contaminants in migrating contaminated water	Low	Low	Very low	Negligible	Minor beneficial
Exposure of adjacent human receptors (residents) to contamination by inhalation of migrating ground-gas and volatile vapours from contaminated soil/water	Low	Low	Very low	Negligible	Minor beneficial
Exposure of adjacent human receptors (school) to contamination by direct contact, ingestion and inhalation of contaminants in windblown, soil-derived dust	Low	Low	Very low	Negligible	Minor beneficial
Exposure of adjacent human receptors (school) to contamination by direct contact and ingestion of contaminants in migrating contaminated water	Low	Low	Very low	Negligible	Minor beneficial
Exposure of adjacent human receptors (school) to contamination by inhalation of migrating ground-gas and volatile vapours from contaminated soil/water	Low	Low	Very low	Negligible	Minor beneficial
Leaching of contaminants from soil to groundwater and vertical and lateral migration in groundwater in Secondary A superficial aquifers and Secondary B bedrock aquifer	Low	Moderate/low	Very low	Minor adverse	Minor beneficial
Lateral migration of contaminants in groundwater and discharge to surface waters as base flow	Very low	Very low	Very low	Negligible	Negligible
Discharge of contaminants to surface water by direct run-off from site	Very low	Very low	Very low	Negligible	Negligible
Direct contact of property with contaminants in soil and surface water/groundwater	Very low	Very low	Very low	Negligible	Negligible
Migration and accumulation of ground-gas into property	Low	Low	Very low	Negligible	Minor beneficial
Main risk	Low	Moderate/low	Very low		
Overall significance				Negligible – Minor adverse	Negligible – Minor beneficial

Table 51: 22-48 Whittington Heath baseline CSM and qualitative risk assessment

Source	Receptor	Pathway	Probability	Consequence	Risk at baseline without mitigation
Whittington Heath Existing contaminants in the soil and groundwater at the site, potentially including but not limited to fuels, oils, solvents, degreasers, metals, asbestos, ordinance, explosives residues.	On-site users of commercial properties	Direct contact, ingestion and inhalation of contaminants in windblown soil-derived dust	Low likelihood	Minor	Low
		Direct contact and ingestion of contaminants in migrating contaminated waters	Unlikely	Minor	Very low
		Inhalation of volatile vapours from contaminated soil/water	Unlikely	Minor	Very low
	Off-site residents	Direct contact, ingestion and inhalation of contaminants in windblown soil-derived dust	Low likelihood	Minor	Low
		Direct contact and ingestion of contaminants in migrating contaminated waters	Unlikely	Minor	Very low
		Inhalation of volatile vapours from contaminated soil/water	Unlikely	Minor	Very low
	Controlled waters - Principal bedrock aquifer	Leaching of contaminants from soil to groundwater and vertical and lateral migration in Principal bedrock aquifer	Low likelihood	Minor	Low
	Controlled waters - unnamed stream - ponds	Lateral migration of contaminants in groundwater and discharge as base flow	Unlikely	Minor	Very low
		Direct run-off from site	Unlikely	Minor	Very low
	Property - buildings, infrastructure, their foundations and services	Direct contact of property with contaminants in soil and surface water/groundwater	Low likelihood	Negligible	Very low
Main risk	Low risk				

Description

Whittington Heath is situated on route and in the eastern and western areas of land required to build the Proposed Scheme, which would be constructed in cutting and on embankment. The land may have been used for military training exercises. There are residential and commercial properties within 250m of Whittington Heath and the nearest surface waters include an unnamed stream approximately 130m south east and ponds at various locations up to 250m from the Heath. There are no superficial deposits recorded at the site and the underlying bedrock is classified as a Principal aquifer.

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Table 52: 22-48 Whittington Heath construction CSM and qualitative risk assessment

Source	Receptor	Pathway	Probability	Consequence	Risk at construction with mitigation
Whittington Heath Existing contaminants in the soil and groundwater at the site, potentially including but not limited to fuels, oils, solvents, degreasers, metals, asbestos, ordinance, explosives residues.	On-site users of commercial properties	Direct contact, ingestion and inhalation of contaminants in windblown soil-derived dust	Low likelihood	Minor	Low
		Direct contact and ingestion of contaminants in migrating contaminated waters	Unlikely	Minor	Very low
		Inhalation of volatile vapours from contaminated soil/water	Unlikely	Minor	Very low
	Off-site residents	Direct contact, ingestion and inhalation of contaminants in windblown soil-derived dust	Low likelihood	Minor	Low
		Direct contact and ingestion of contaminants in migrating contaminated waters	Unlikely	Minor	Very low
		Inhalation of volatile vapours from contaminated soil/water	Unlikely	Minor	Very low
	Controlled waters - Principal bedrock aquifer	Leaching of contaminants from soil to groundwater and vertical and lateral migration in Principal bedrock aquifer	Likely	Minor	Moderate/low
	Controlled waters - unnamed stream - ponds	Lateral migration of contaminants in groundwater and discharge as base flow	Unlikely	Minor	Very low
		Direct run-off from site	Unlikely	Minor	Very low
	Property - buildings, infrastructure, their foundations and services	Direct contact of property with contaminants in soil and surface water/groundwater	Low likelihood	Negligible	Very low
Main risk	Moderate/low risk				

The above risk assessment assumes that the below mitigation measures would be applied during construction:

- as the Heath lies on route and in the area of land required to build the Proposed Scheme it will likely be disturbed;
- it is unlikely that remediation over and above the removal of contaminated material would be required; and
- during construction standard mitigation procedures will be in place in accordance with the CoCP.

Note

Construction workers have not been included in this assessment.

Table 53: 22-48 Whittington Heath post-construction CSM and qualitative risk assessment

Source	Receptor	Pathway	Probability	Consequence	Risk at post-construction with mitigation
Whittington Heath Existing contaminants in the soil and groundwater at the site, potentially including but not limited to fuels, oils, solvents, degreasers, metals, asbestos, ordinance, explosives residues.	On-site users of commercial properties	Direct contact, ingestion and inhalation of contaminants in windblown soil-derived dust	Low likelihood	Minor	Low
		Direct contact and ingestion of contaminants in migrating contaminated waters	Unlikely	Minor	Very low
		Inhalation of volatile vapours from contaminated soil/water	Unlikely	Minor	Very low
	Off-site residents	Direct contact, ingestion and inhalation of contaminants in windblown soil-derived dust	Low likelihood	Minor	Low
		Direct contact and ingestion of contaminants in migrating contaminated waters	Unlikely	Minor	Very low
		Inhalation of volatile vapours from contaminated soil/water	Unlikely	Minor	Very low
	Controlled waters - Principal bedrock aquifer	Leaching of contaminants from soil to groundwater and vertical and lateral migration in Principal bedrock aquifer	Low likelihood	Minor	Low
	Controlled waters - unnamed stream - ponds	Lateral migration of contaminants in groundwater and discharge as base flow	Unlikely	Minor	Very low
		Direct run-off from site	Unlikely	Minor	Very low
	Property - buildings, infrastructure, their foundations and services	Direct contact of property with contaminants in soil and surface water/groundwater	Low likelihood	Negligible	Very low
Main risk	Low risk				

Note

Should any contamination have been encountered during construction this will have been removed. However, the Heath will largely remain as the baseline situation.

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Table 54: 22-48 Whittington Heath significance of effect assessment

Contaminant linkage	Baseline risk	Construction risk	Post-construction risk	Construction significance	Post-construction significance
Exposure of on-site human receptors (commercial) to contamination by direct contact, ingestion and inhalation of contaminants in windblown, soil-derived dust	Low	Low	Low	Negligible	Negligible
Exposure of on-site human receptors (commercial) to contamination by direct contact and ingestion of contaminants in migrating contaminated water	Very low	Very low	Very low	Negligible	Negligible
Exposure of on-site human receptors (commercial) to contamination by inhalation of migrating volatile vapours from contaminated soil/water	Very low	Very low	Very low	Negligible	Negligible
Exposure of adjacent human receptors (residential) to contamination by direct contact, ingestion and inhalation of contaminants in windblown, soil-derived dust	Low	Low	Low	Negligible	Negligible
Exposure of adjacent human receptors (residential) to contamination by direct contact and ingestion of contaminants in migrating contaminated water	Very low	Very low	Very low	Negligible	Negligible
Exposure of adjacent human receptors (residential) to contamination by inhalation of migrating volatile vapours from contaminated soil/water	Very low	Very low	Very low	Negligible	Negligible
Leaching of contaminants from soil to groundwater and vertical and lateral migration in groundwater in Principal bedrock aquifer	Low	Moderate/low	Low	Minor adverse	Negligible
Lateral migration of contaminants in groundwater and discharge to surface waters as base flow	Very low	Very low	Very low	Negligible	Negligible
Discharge of contaminants to surface water by direct run-off from site	Very low	Very low	Very low	Negligible	Negligible
Direct contact of property with contaminants in soil and surface water/groundwater	Very low	Very low	Very low	Negligible	Negligible
Main risk	Low	Moderate/low	Low		
Overall significance				Negligible – minor adverse	Negligible

Table 55: 22-49 Whittington Barracks baseline CSM and qualitative risk assessment

Source	Receptor	Pathway	Probability	Consequence	Risk at baseline without mitigation
Whittington Barracks Existing contaminants in the soil and groundwater at the site, potentially including but not limited to fuels, oils, solvents, degreasers, metals, asbestos, ordnance, explosives residues.	On-site residents	Direct contact, ingestion and inhalation of contaminants in windblown soil-derived dust	Low likelihood	Minor	Low
		Direct contact and ingestion of contaminants in migrating contaminated waters	Unlikely	Minor	Very low
		Inhalation of volatile vapours from contaminated soil/water	Unlikely	Minor	Very low
	On-site commercial	Direct contact, ingestion and inhalation of contaminants in windblown soil-derived dust	Low likelihood	Minor	Low
		Direct contact and ingestion of contaminants in migrating contaminated waters	Unlikely	Minor	Very low
		Inhalation of volatile vapours from contaminated soil/water	Unlikely	Minor	Very low
	Off-site residents	Direct contact, ingestion and inhalation of contaminants in windblown soil-derived dust	Low likelihood	Minor	Low
		Direct contact and ingestion of contaminants in migrating contaminated waters	Unlikely	Minor	Very low
		Inhalation of volatile vapours from contaminated soil/water	Unlikely	Minor	Very low
	Off-site commercial	Direct contact, ingestion and inhalation of contaminants in windblown soil-derived dust	Low likelihood	Negligible	Very low
		Direct contact and ingestion of contaminants in migrating contaminated waters	Unlikely	Negligible	Very low
		Inhalation of volatile vapours from contaminated soil/water	Unlikely	Minor	Very low
	Controlled waters - Principal bedrock aquifer	Leaching of contaminants from soil to groundwater and vertical and lateral migration in Principal bedrock aquifer	Low likelihood	Minor	Low

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Source	Receptor	Pathway	Probability	Consequence	Risk at baseline without mitigation
	Controlled waters - surface watercourses	Lateral migration of contaminants in groundwater and discharge as base flow	Unlikely	Minor	Very low
		Direct run-off from site	Unlikely	Minor	Very low
	Property - buildings, infrastructure, their foundations and services	Direct contact of property with contaminants in soil and surface water/groundwater	Low likelihood	Negligible	Very low
Main risk	Low risk				

Description

Whittington Barracks is situated adjacent and up to 250m east of the area of land required to build the Proposed Scheme, which would be constructed in cutting and on embankment. A range of contaminants are associated with the barracks. There are residential and commercial properties within 250m and the nearest surface waters include an unnamed stream which flows along the southern edge of the barracks and ponds which are situated up to 250m from the barracks. There are no superficial deposits recorded and the underlying bedrock is classified as a Principal aquifer.

Table 56: 22-49 Whittington Barracks construction CSM and qualitative risk assessment

Source	Receptor	Pathway	Probability	Consequence	Risk at construction with mitigation
Whittington Barracks Existing contaminants in the soils and groundwater at the site, potentially including but not limited to fuels, oils, metals and asbestos.	On-site residents	Direct contact, ingestion and inhalation of contaminants in windblown soil-derived dust	Low likelihood	Minor	Low
		Direct contact and ingestion of contaminants in migrating contaminated waters	Unlikely	Minor	Very low
		Inhalation of volatile vapours from contaminated soil/water	Unlikely	Minor	Very low
	On-site commercial	Direct contact, ingestion and inhalation of contaminants in windblown soil-derived dust	Low likelihood	Minor	Low
		Direct contact and ingestion of contaminants in migrating contaminated waters	Unlikely	Minor	Very low
		Inhalation of volatile vapours from contaminated soil/water	Unlikely	Minor	Very low
	Off-site residents	Direct contact, ingestion and inhalation of contaminants in windblown soil-derived dust	Low likelihood	Minor	Low
		Direct contact and ingestion of contaminants in migrating contaminated waters	Unlikely	Minor	Very low
		Inhalation of volatile vapours from contaminated soil/water	Unlikely	Minor	Very low
	Off-site commercial	Direct contact, ingestion and inhalation of contaminants in windblown soil-derived dust	Low likelihood	Negligible	Very low
		Direct contact and ingestion of contaminants in migrating contaminated waters	Unlikely	Negligible	Very low
		Inhalation of volatile vapours from contaminated soil/water	Unlikely	Minor	Very low
	Controlled waters - Principal bedrock aquifer	Leaching of contaminants from soil to groundwater and vertical and lateral migration in Principal bedrock aquifer	Low likelihood	Minor	Low
	Controlled waters - Trent and Mersey Canal - Curborough Brook - ponds	Lateral migration of contaminants in groundwater and discharge as base flow	Unlikely	Minor	Very low
		Direct run-off from site	Unlikely	Minor	Very low

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Source	Receptor	Pathway	Probability	Consequence	Risk at construction with mitigation
	Property - buildings, infrastructure, their foundations and services	Direct contact of property with contaminants in soil and surface water/groundwater	Low likelihood	Negligible	Very low
Main risk	Low risk				

The above risk assessment assumes that the below mitigation measures would be applied during construction:

- as the Barracks lie outside of the area of land required to construct the Proposed Scheme, it is unlikely that it will be disturbed during construction;
- during construction standard mitigation procedures will be in place in accordance with the CoCP.

Note

Construction workers have not been included in this assessment.

Table 57: 22-49 Whittington Barracks post-construction CSM and qualitative risk assessment

Source	Receptor	Pathway	Probability	Consequence	Risk at post-construction with mitigation
Whittington Barracks Existing contaminants in the soils and groundwater at the site, potentially including but not limited to fuels, oils, metals and asbestos.	On-site residents	Direct contact, ingestion and inhalation of contaminants in windblown soil-derived dust	Low likelihood	Minor	Low
		Direct contact and ingestion of contaminants in migrating contaminated waters	Unlikely	Minor	Very low
		Inhalation of volatile vapours from contaminated soil/water	Unlikely	Minor	Very low
	On-site commercial	Direct contact, ingestion and inhalation of contaminants in windblown soil-derived dust	Low likelihood	Minor	Low
		Direct contact and ingestion of contaminants in migrating contaminated waters	Unlikely	Minor	Very low
		Inhalation of volatile vapours from contaminated soil/water	Unlikely	Minor	Very low
	Off-site residents	Direct contact, ingestion and inhalation of contaminants in windblown soil-derived dust	Low likelihood	Minor	Low
		Direct contact and ingestion of contaminants in migrating contaminated waters	Unlikely	Minor	Very low
		Inhalation of volatile vapours from contaminated soil/water	Unlikely	Minor	Very low
	Off-site commercial	Direct contact, ingestion and inhalation of contaminants in windblown soil-derived dust	Low likelihood	Negligible	Very low
		Direct contact and ingestion of contaminants in migrating contaminated waters	Unlikely	Negligible	Very low
		Inhalation of volatile vapours from contaminated soil/water	Unlikely	Minor	Very low
	Controlled waters - Principal bedrock aquifer	Leaching of contaminants from soil to groundwater and vertical and lateral migration in Principal bedrock aquifer	Low likelihood	Minor	Low
	Controlled waters - Trent and Mersey Canal	Lateral migration of contaminants in groundwater and discharge as base flow	Unlikely	Minor	Very low

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Source	Receptor	Pathway	Probability	Consequence	Risk at post-construction with mitigation
	- Curborough Brook - ponds	Direct run-off from site	Unlikely	Minor	Very low
	Property - buildings, infrastructure, their foundations and services	Direct contact of property with contaminants in soil and surface water/groundwater	Low likelihood	Negligible	Very low
Main risk	Low risk				

Note

The Barracks will remain post construction and so risks remain same as at baseline.

Table 58: 22-49 Whittington Barracks significance of effect assessment

Contaminant linkage	Baseline risk	Construction risk	Post-construction risk	Construction significance	Post-construction significance
Exposure of on-site human receptors (residents) to contamination by direct contact, ingestion and inhalation of contaminants in windblown, soil-derived dust	Low	Low	Low	Negligible	Negligible
Exposure of on-site human receptors (residents) to contamination by direct contact and ingestion of contaminants in migrating contaminated water	Very low	Very low	Very low	Negligible	Negligible
Exposure of adjacent human receptors (residential) to contamination by inhalation of migrating volatile vapours from contaminated soil/water	Very low	Very low	Very low	Negligible	Negligible
Exposure of on-site human receptors (commercial) to contamination by direct contact, ingestion and inhalation of contaminants in windblown, soil-derived dust	Low	Low	Low	Negligible	Negligible
Exposure of on-site human receptors (commercial) to contamination by direct contact and ingestion of contaminants in migrating contaminated water	Very low	Very low	Very low	Negligible	Negligible
Exposure of adjacent human receptors (residential) to contamination by inhalation of migrating volatile vapours from contaminated soil/water	Very low	Very low	Very low	Negligible	Negligible
Exposure of off-site human receptors (residents) to contamination by direct contact, ingestion and inhalation of contaminants in windblown, soil-derived dust	Low	Low	Low	Negligible	Negligible
Exposure of off-site human receptors (residents) to contamination by direct contact and ingestion of contaminants in migrating contaminated water	Very low	Very low	Very low	Negligible	Negligible
Exposure of adjacent human receptors (residential) to contamination by inhalation of migrating volatile vapours from contaminated soil/water	Very low	Very low	Very low	Negligible	Negligible
Exposure of off-site human receptors (commercial) to contamination by direct contact, ingestion and inhalation of contaminants in windblown, soil-derived dust	Very low	Very low	Very low	Negligible	Negligible
Exposure of off-site human receptors (commercial) to contamination by direct contact and ingestion of contaminants in migrating contaminated water	Very low	Very low	Very low	Negligible	Negligible
Exposure of adjacent human receptors (residential) to contamination by inhalation of migrating volatile vapours from contaminated soil/water	Very low	Very low	Very low	Negligible	Negligible
Leaching of contaminants from soil to groundwater and vertical and lateral migration in groundwater in Principal bedrock aquifer	Low	Low	Low	Negligible	Negligible

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Contaminant linkage	Baseline risk	Construction risk	Post-construction risk	Construction significance	Post-construction significance
Lateral migration of contaminants in groundwater and discharge to surface waters as base flow	Very low	Very low	Very low	Negligible	Negligible
Discharge of contaminants to surface water by direct run-off from site	Very low	Very low	Very low	Negligible	Negligible
Direct contact of property with contaminants in soil and surface water/groundwater	Very low	Very low	Very low	Negligible	Negligible
Main risk	Low	Low	Low		
Overall significance				Negligible	Negligible

Table 59: 22-51 Garage baseline CSM and qualitative risk assessment

Source	Receptor	Pathway	Probability	Consequence	Risk at baseline without mitigation
Garage Existing contaminants in the soils and groundwater at the source, potentially including but not limited to heavy metals (chromium, copper, lead, zinc), asbestos, oil/fuel hydrocarbons, aromatic hydrocarbons, PAHs, chlorinated aliphatic compounds and organolead compounds.	Current site users	Direct contact, ingestion and inhalation of contaminants in soil and soil-derived dust	Low likelihood	Minor	Low
		Direct contact and ingestion of contaminants in contaminated waters	Unlikely	Minor	Very low
		Inhalation of volatile vapours from contaminated soil/water	Low likelihood	Minor	Low
	Users of off-site commercial properties	Direct contact, ingestion and inhalation of contaminants in windblown soil-derived dust	Unlikely	Negligible	Very low
		Direct contact and ingestion of contaminants in migrating contaminated waters	Unlikely	Negligible	Very low
		Inhalation of migrating volatile vapours from contaminated soil/water.	Low likelihood	Negligible	Very low
	Controlled waters - Principal bedrock aquifer	Leaching of contaminants from soil to groundwater and vertical and lateral migration in groundwater in Principal aquifer	Low likelihood	Minor	Low
	Property - buildings, infrastructure, their foundations and services	Direct contact of property with contaminants in soil and surface water/groundwater	Low likelihood	Negligible	Very low
Main risk	Low risk				

Description

The garage is situated immediately to the south of the Whittington to Handsacre CFA within the Drayton Bassett, Hints and Weeford CFA. However, as the Whittington to Handsacre study area encroaches into this area the garage is assessed in both areas. The garage is located within the eastern area required to construct the Proposed Scheme which will be constructed in cutting. The garage will be demolished and used as part of the cutting works and for a satellite compound. A realistic and worst-case assumption has been made that there have been oil/fuel leaks at the garage and that contamination is present in the soil and groundwater. There are no residential properties within 250m of the garage but there are commercial properties associated with the golf course and Whittington Barracks. There are no surface water receptors within 250m of the garage. Bedrock underlying the site is classified as a Principal aquifer.

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Table 60: 22-51 Garage construction CSM and qualitative risk assessment

Source	Receptor	Pathway	Probability	Consequence	Risk at construction with mitigation
Garage Existing contaminants in the soils and groundwater at the source, potentially including but not limited to heavy metals (chromium, copper, lead, zinc), asbestos, oil/fuel hydrocarbons, aromatic hydrocarbons, PAHs, chlorinated aliphatic compounds and organolead compounds.	Current site users	Direct contact, ingestion and inhalation of contaminants in soil and soil-derived dust	Not present during construction		
		Direct contact and ingestion of contaminants in contaminated waters	Not present during construction		
		Inhalation of volatile vapours from contaminated soil/water	Not present during construction		
	Users of off-site commercial properties	Direct contact, ingestion and inhalation of contaminants in windblown soil-derived dust	Unlikely	Negligible	Very low
		Direct contact and ingestion of contaminants in migrating contaminated waters	Unlikely	Negligible	Very low
		Inhalation of migrating volatile vapours from contaminated soil/water.	Low likelihood	Negligible	Very low
	Controlled waters - Principal bedrock aquifer	Leaching of contaminants from soil to groundwater and vertical and lateral migration in groundwater in Principal aquifer	Likely	Minor	Moderate/low
	Property - buildings, infrastructure, their foundations and services	Direct contact of property with contaminants in soil and surface water/groundwater	Low likelihood	Negligible	Very low
Main risk	Moderate/low				

The above risk assessment assumes that the below mitigation measures will be applied during construction:

- a ground investigation is likely to be required prior to construction;
- it is unlikely that remediation over and above the removal of contaminated material, if encountered, will be required;
- during construction standard mitigation procedures will be in place in accordance with the CoCP.

Note

Construction workers have not been included in this assessment. It is understood that the garage will be demolished so the on-site receptors at baseline will no longer be present. It is considered that there may be a slightly increased risk of mobilisation and leaching of existing contamination to groundwater during construction.

Table 61: 22-51 Garage post-construction CSM and qualitative risk assessment

Source	Receptor	Pathway	Probability	Consequence	Risk at post-construction with mitigation
Garage Existing contaminants in the soils and groundwater at the source, potentially including but not limited to heavy metals (chromium, copper, lead, zinc), asbestos, oil/fuel hydrocarbons, aromatic hydrocarbons, PAHs, chlorinated aliphatic compounds and organolead compounds.	Current site users	Direct contact, ingestion and inhalation of contaminants in soil and soil-derived dust	Not present during post-construction		
		Direct contact and ingestion of contaminants in contaminated waters	Not present during post-construction		
		Inhalation of volatile vapours from contaminated soil/water	Not present during post-construction		
	Users of off-site commercial properties	Direct contact, ingestion and inhalation of contaminants in windblown soil-derived dust	Unlikely	Negligible	Very low
		Direct contact and ingestion of contaminants in migrating contaminated waters	Unlikely	Negligible	Very low
		Inhalation of migrating volatile vapours from contaminated soil/water.	Unlikely	Negligible	Very low
	Controlled waters - Principal bedrock aquifer	Leaching of contaminants from soil to groundwater and vertical and lateral migration in groundwater in Principal aquifer	Unlikely	Minor	Very low
	Property - buildings, infrastructure, their foundations and services	Direct contact of property with contaminants in soil and surface water/groundwater	Unlikely	Negligible	Very low
Main risk	Very low risk				

Note

It is assumed that any contaminated material will be removed during construction so there should be no residual contamination within the area of land required to construct the Proposed Scheme.
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Table 62: 22-51 Garage significance of effect assessment

Contaminant linkage	Baseline risk	Construction risk	Post-construction risk	Construction significance	Post-construction significance
Exposure of on-site human receptors to contamination by direct contact, ingestion and inhalation of contaminants in soil and soil-derived dust	Low	Not present during construction	Not present during post-construction	n/a	n/a
Exposure of on-site human receptors by direct contact and ingestion of contaminated waters	Very low	Not present during construction	Not present during post-construction	n/a	n/a
Exposure of on-site humans to contamination by inhalation of volatile vapours from contaminated soil/water	Low	Not present during construction	Not present during post-construction	n/a	n/a
Exposure of adjacent human receptors (in commercial properties) to contamination by direct contact, ingestion and inhalation of contaminants in windblown, soil-derived dust	Very low	Very low	Very low	Negligible	Negligible
Exposure of adjacent human receptors (in commercial properties) to contamination by direct contact and ingestion of contaminants in migrating contaminated water	Very low	Very low	Very low	Negligible	Negligible
Exposure of adjacent human receptors (in commercial properties) to contamination by inhalation of migrating and volatile vapours from contaminated soil/water	Very low	Very low	Very low	Negligible	Negligible
Leaching of contaminants from soil to groundwater and vertical and lateral migration in groundwater in Principal aquifer	Low	Moderate/low	Very low	Minor adverse	Minor beneficial
Direct contact of property with contaminants in soil and surface water/groundwater	Very low	Very low	Very low	Negligible	Negligible
Main risk	Low	Moderate/low	Very low		
Overall significance				Negligible to minor adverse	Negligible to minor beneficial

Table 63: 22-58, 22-61 and 22-70 Existing railway lines baseline CSM and qualitative risk assessment

Source	Receptor	Pathway	Probability	Consequence	Risk at baseline without mitigation
West Coast Main Line and South Staffordshire Line Existing contaminants in the soils and groundwater at the site, potentially including but not limited to oil/fuel hydrocarbons, aromatic hydrocarbons, metals, fuels, oils, asbestos and sulphates	Off-site residents	Direct contact, ingestion and inhalation of contaminants in windblown soil-derived dust	Low likelihood	Minor	Low
		Direct contact and ingestion of contaminants in migrating contaminated waters	Unlikely	Minor	Very low
		Inhalation of migrating volatile vapours from contaminated soil/water	Low likelihood	Minor	Low
	Controlled waters - Principal and Secondary B bedrock aquifers and Secondary A superficial aquifers	Leaching of contaminants from soil to groundwater and vertical and lateral migration in Principal and Secondary B bedrock aquifers and Secondary A superficial aquifers	Low likelihood	Minor	Low
	Controlled waters - Coventry Canal - Bourne Brook - ponds	Lateral migration of contaminants in groundwater and discharge as base flow	Unlikely	Minor	Very low
		Direct run-off from site	Unlikely	Minor	Very low
	Property - buildings, infrastructure, their foundations and services	Direct contact of property with contaminants in soil and surface water/groundwater	Low likelihood	Negligible	Very low
Main risk	Low risk				

Description

The Proposed Scheme will cross the West Coast Main Line (WCML) on embankment to the east of Lichfield and joins with this railway line to the south of Handsacre on embankment/viaduct. The Proposed Scheme will also cross the South Staffordshire Line on viaduct to the east of Lichfield. A range of contaminants are associated with existing railway lines. There are residential properties within 250m of both lines and the nearest surface waters within 250m include the Coventry Canal, the Bourne Brook and ponds. Bedrock deposits underlying where the WCML is intersected by the Proposed Scheme is classified as a Principal aquifer, and where the Proposed Scheme intersects the South Staffordshire railway line and then joins the WCML, the bedrock deposits are classified as a Secondary B aquifer. There are no superficial deposits underlying where the Proposed Scheme crosses the WCML and the South Staffordshire Line; however, there are superficial deposits classified as Secondary A aquifers where the Proposed Scheme joins the WCML.

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Table 64: 22-58, 22-61 and 22-70 Existing railway lines construction CSM and qualitative risk assessment

Source	Receptor	Pathway	Probability	Consequence	Risk at construction with mitigation
West Coast Main Line and South Staffordshire Line Existing contaminants in the soils and groundwater at the site, potentially including but not limited to oil/fuel hydrocarbons, aromatic hydrocarbons, metals, fuels, oils, asbestos and sulphates	Off-site residents	Direct contact, ingestion and inhalation of contaminants in windblown soil-derived dust	Low likelihood	Minor	Low
		Direct contact and ingestion of contaminants in migrating contaminated waters	Unlikely	Minor	Very low
		Inhalation of migrating volatile vapours from contaminated soil/water	Low likelihood	Minor	Low
	Controlled waters - Principal and Secondary B bedrock aquifers and Secondary A superficial aquifers	Leaching of contaminants from soil to groundwater and vertical and lateral migration in Principal and Secondary B bedrock aquifers and Secondary A superficial aquifers	Likely	Minor	Moderate/low
	Controlled waters - Coventry Canal - Bourne Brook - ponds	Lateral migration of contaminants in groundwater and discharge as base flow	Unlikely	Minor	Very low
		Direct run-off from site	Unlikely	Minor	Very low
	Property - buildings, infrastructure, their foundations and services	Direct contact of property with contaminants in soil and surface water/groundwater	Low likelihood	Negligible	Very low
Main risk	Moderate/low risk				

The above risk assessment assumes that the below mitigation measures would be applied during construction:

- route will cross railways on viaduct or embankment and joins with the WCML so there is the possibility that contamination will be disturbed;
- it is unlikely that remediation over and above the removal of contaminated material would be required; and
- during construction standard mitigation procedures will be in place in accordance with the CoCP.

Note

Construction workers have not been included in this assessment.

Table 65: 22-58, 22-61 and 22-70 Existing railway lines post-construction CSM and qualitative risk assessment

Source	Receptor	Pathway	Probability	Consequence	Risk at post-construction with mitigation
West Coast Main Line and South Staffordshire Line Existing contaminants in the soils and groundwater at the site, potentially including but not limited to oil/fuel hydrocarbons, aromatic hydrocarbons, metals, fuels, oils, asbestos and sulphates	Off-site residents	Direct contact, ingestion and inhalation of contaminants in windblown soil-derived dust	Low likelihood	Minor	Low
		Direct contact and ingestion of contaminants in migrating contaminated waters	Unlikely	Minor	Very low
		Inhalation of migrating volatile vapours from contaminated soil/water	Low likelihood	Minor	Low
	Controlled waters - Principal and Secondary B bedrock aquifers and Secondary A superficial aquifers	Leaching of contaminants from soil to groundwater and vertical and lateral migration in Principal and Secondary B bedrock aquifers and Secondary A superficial aquifers	Low likelihood	Minor	Low
	Controlled waters - Coventry Canal - Bourne Brook - ponds	Lateral migration of contaminants in groundwater and discharge as base flow	Unlikely	Minor	Very low
		Direct run-off from site	Unlikely	Minor	Very low
	Property - buildings, infrastructure, their foundations and services	Direct contact of property with contaminants in soil and surface water/groundwater	Low likelihood	Negligible	Very low
Main risk	Low risk				

Note

Railway lines will still be present post-construction so risks remain same as those at baseline.
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Table 66: 22-58, 22-61 and 22-70 Existing railway lines significance of effect assessment

Contaminant linkage	Baseline risk	Construction risk	Post-construction risk	Construction significance	Post-construction significance
Exposure of adjacent human receptors (residents) to contamination by direct contact, ingestion and inhalation of contaminants in windblown, soil-derived dust	Low	Low	Low	Negligible	Negligible
Exposure of adjacent human receptors (residents) to contamination by direct contact and ingestion of contaminants in migrating contaminated water	Very low	Very low	Very low	Negligible	Negligible
Exposure of adjacent human receptors (residents) to contamination by inhalation of migrating volatile vapours from contaminated soil/water	Low	Low	Low	Negligible	Negligible
Leaching of contaminants from soil to groundwater and vertical and lateral migration in groundwater in Secondary A bedrock aquifers and Secondary A superficial aquifers	Low	Moderate/low	Low	Minor adverse	Negligible
Lateral migration of contaminants in groundwater and discharge to surface waters as base flow	Very low	Very low	Very low	Negligible	Negligible
Discharge of contaminants to surface water by direct run-off from site	Very low	Very low	Very low	Negligible	Negligible
Direct contact of property with contaminants in soil and surface water/groundwater	Very low	Very low	Very low	Negligible	Negligible
Main risk	Low	Moderate/low	Low		
Overall significance				Negligible – minor adverse	Negligible

Table 67: 22-72 Metal works baseline CSM and qualitative risk assessment

Source	Receptor	Pathway	Probability	Consequence	Risk at baseline without mitigation
Metal works with associated tanks (former food processing plant) Existing contaminants in the soil and groundwater at the site, potentially including but not limited to heavy metals (cadmium, chromium, copper, lead, mercury, nickel, vanadium, zinc, arsenic and boron), free cyanide, nitrates, sulphates, asbestos, oil/fuel hydrocarbons, aromatic and aliphatic hydrocarbons, PAHs and PCBs.	On-site users of commercial properties	Direct contact, ingestion and inhalation of contaminants in windblown soil-derived dust	Low likelihood	Minor	Low
		Direct contact and ingestion of contaminants in contaminated waters	Unlikely	Minor	Very low
		Inhalation of volatile vapours from contaminated soil/water	Low likelihood	Minor	Low
	Off-site residents	Direct contact, ingestion and inhalation of contaminants in windblown soil-derived dust	Low likelihood	Minor	Low
		Direct contact and ingestion of contaminants in migrating contaminated waters	Unlikely	Minor	Very low
		Inhalation of migrating volatile vapours from contaminated soil/water	Low likelihood	Minor	Low
	Controlled waters - Secondary B bedrock aquifer and Secondary A superficial aquifer	Leaching of contaminants from soil to groundwater and vertical and lateral migration in Secondary B bedrock aquifer and Secondary A superficial aquifer	Low likelihood	Minor	Low
	Controlled waters - ponds - drain - marina - unnamed stream	Lateral migration of contaminants in groundwater and discharge as base flow	Unlikely	Minor	Very low
		Direct run-off from site	Unlikely	Minor	Very low
	Property - buildings, infrastructure, their foundations and services	Direct contact of property with contaminants in soil and surface water/groundwater	Low likelihood	Negligible	Very low
Main risk	Low risk				

Description

The current metal works with associated tanks (also a former food processing plant) is situated 20m east of the area of land required to build the Proposed Scheme, which would be constructed on embankment. A realistic scenario has been assumed that the tanks will have been used to store fuel and oil and have leaked so a variety of contaminants including heavy metals, oil and fuel could be present. There are residential properties within 250m of the metal works and the nearest surface waters include the Trent and Mersey Canal adjacent east, the Bourne Brook approximately 175m north, Lichfield Marina adjacent north-west and ponds up to 250m of the metal works. Superficial deposits are classified as a Secondary A aquifer and bedrock is classified as a Secondary B aquifer.

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Table 68: 22-72 Metal works construction CSM and qualitative risk assessment

Source	Receptor	Pathway	Probability	Consequence	Risk at construction with mitigation
Metal works with associated tanks (former food processing plant) Existing contaminants in the soil and groundwater at the site, potentially including but not limited to heavy metals (cadmium, chromium, copper, lead, mercury, nickel, vanadium, zinc, arsenic and boron), free cyanide, nitrates, sulphates, asbestos, oil/fuel hydrocarbons, aromatic and aliphatic hydrocarbons, PAHs and PCBs.	On-site users of commercial properties	Direct contact, ingestion and inhalation of contaminants in windblown soil-derived dust	Low likelihood	Minor	Low
		Direct contact and ingestion of contaminants in migrating contaminated waters	Unlikely	Minor	Very low
		Inhalation of migrating volatile vapours from contaminated soil/water	Low likelihood	Minor	Low
	Off-site residents	Direct contact, ingestion and inhalation of contaminants in windblown soil-derived dust	Low likelihood	Minor	Low
		Direct contact and ingestion of contaminants in migrating contaminated waters	Unlikely	Minor	Very low
		Inhalation of migrating volatile vapours from contaminated soil/water	Low likelihood	Minor	Low
	Controlled waters - Secondary B bedrock aquifer and Secondary A superficial aquifer	Leaching of contaminants from soil to groundwater and vertical and lateral migration in Secondary B bedrock aquifer and Secondary A superficial aquifer	Low likelihood	Minor	Low
	Controlled waters - ponds - drain - marina - unnamed stream	Lateral migration of contaminants in groundwater and discharge as base flow	Unlikely	Minor	Very low
		Direct run-off from site	Unlikely	Minor	Very low
	Property - buildings, infrastructure, their foundations and services	Direct contact of property with contaminants in soil and surface water/groundwater	Low likelihood	Negligible	Very low
Main risk	Low risk				

The above risk assessment assumes that the below mitigation measures would be applied during construction:

- the Proposed Scheme will pass the metal works on embankment and works in the land required to construct the Proposed Scheme are unlikely to disturb the site. Any contaminated material encountered will be removed;
- it is unlikely that remediation over and above the removal of contaminated material would be required; and
- during construction standard mitigation procedures will be in place in accordance with the CoCP.

Note

Construction workers have not been included in this assessment.

Table 69: 22-72 Metal works post-construction CSM and qualitative risk assessment

Source	Receptor	Pathway	Probability	Consequence	Risk at post-construction with mitigation
Metal works with associated tanks (former food processing plant) Existing contaminants in the soil and groundwater at the site, potentially including but not limited to heavy metals (cadmium, chromium, copper, lead, mercury, nickel, vanadium, zinc, arsenic and boron), free cyanide, nitrates, sulphates, asbestos, oil/fuel hydrocarbons, aromatic and aliphatic hydrocarbons, PAHs and PCBs.	On-site users of commercial properties	Direct contact, ingestion and inhalation of contaminants in windblown soil-derived dust	Low likelihood	Minor	Low
		Direct contact and ingestion of contaminants in migrating contaminated waters	Unlikely	Minor	Very low
		Inhalation of migrating volatile vapours from contaminated soil/water	Low likelihood	Minor	Low
	Off-site residents	Direct contact, ingestion and inhalation of contaminants in windblown soil-derived dust	Low likelihood	Minor	Low
		Direct contact and ingestion of contaminants in migrating contaminated waters	Unlikely	Minor	Very low
		Inhalation of migrating volatile vapours from contaminated soil/water	Low likelihood	Minor	Low
	Controlled waters - Secondary B bedrock aquifer and Secondary A superficial aquifer	Leaching of contaminants from soil to groundwater and vertical and lateral migration in Secondary B bedrock aquifer and Secondary A superficial aquifer	Low likelihood	Minor	Low
	Controlled waters - ponds - drain - marina - unnamed stream	Lateral migration of contaminants in groundwater and discharge as base flow	Unlikely	Minor	Very low
		Direct run-off from site	Unlikely	Minor	Very low
	Property - buildings, infrastructure, their foundations and services	Direct contact of property with contaminants in soil and surface water/groundwater	Low likelihood	Negligible	Very low
Main risk	Low risk				

Note

Any contamination encountered in the area of land required to construct the Proposed Scheme will be removed during construction. However, the metal works will remain post-construction; therefore, the risks are the same as those at baseline.

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Table 70: 22-72 Metal works significance of effect assessment

Contaminant linkage	Baseline risk	Construction risk	Post-construction risk	Construction significance	Post-construction significance
Exposure of on-site human receptors (commercial) to contamination by direct contact, ingestion and inhalation of contaminants in windblown, soil-derived dust	Low	Low	Low	Negligible	Negligible
Exposure of on-site human receptors (commercial) to contamination by direct contact and ingestion of contaminants in migrating contaminated water	Very low	Very low	Very low	Negligible	Negligible
Exposure of on-site human receptors (commercial) to contamination by inhalation of migrating volatile vapours from contaminated soil/water	Low	Low	Low	Negligible	Negligible
Exposure of adjacent human receptors (residents) to contamination by direct contact, ingestion and inhalation of contaminants in windblown, soil-derived dust	Low	Low	Low	Negligible	Negligible
Exposure of adjacent human receptors (residents) to contamination by direct contact and ingestion of contaminants in migrating contaminated water	Very low	Very low	Very low	Negligible	Negligible
Exposure of adjacent human receptors (residents) to contamination by inhalation of migrating volatile vapours from contaminated soil/water	Low	Low	Low	Negligible	Negligible
Leaching of contaminants from soil to groundwater and vertical and lateral migration in groundwater in Secondary A superficial aquifer and Secondary B bedrock aquifer	Low	Low	Low	Negligible	Negligible
Lateral migration of contaminants in groundwater and discharge to surface waters as base flow	Very low	Very low	Very low	Negligible	Negligible
Discharge of contaminants to surface water by direct run-off from site	Very low	Very low	Very low	Negligible	Negligible
Direct contact of property with contaminants in soil and surface water/groundwater	Very low	Very low	Very low	Negligible	Negligible
Main risk	Low	Low	Low		
Overall significance				Negligible	Negligible

4 **Inspection notes and other site data**

- 4.1.1 There were no sites identified as a priority for inspection in the Whittington to Handsacre area.

5 Geological SSSI and local geological sites

5.1.1 This appendix presents the following data:

- citation data for geological sites of special scientific interest (SSSI);
- citation data for local geological sites (LGS), formerly called regionally important geological sites (RIGS); and
- any other relevant site data.

5.1.2 There are no geological SSSI or local geological sites in the Whittington to Handsacre area.

6 Mining and minerals data

- 6.1.1 This appendix presents the following data relating to mining and minerals information:
- details of planning data for minerals sites;
 - lists of marl pits in each study area; and
 - data from The Coal Authority.
- 6.1.2 There are no relevant mining sites or additional relevant mineral data for the Whittington to Handsacre area.